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J. R. MOHLER, Editor, Washington, D. C.

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## THE VETERINARIAN AND THE PUBLIC

ABSORBED in the development and the pursuit of his professional career, the veterinarian, in the majority of cases, has been entirely oblivious to the fact that activities of the body politic have materially affected the circumstances under which he must offer his services to the public, whether in the laboratory, in the class room or in the practical application of veterinary knowledge and training in the field.

Veterinary science in its broad scope of today is no doubt as valuable an asset to the nation as any of the other groups concerned in the scheme of advanced knowledge. As old as any of the sciences, its modern progress in the world of research relative to the etiology, diagnosis and elimination of animal diseases, all of which are closely allied to the ills of humankind, places it in the rank of the foremost in the value of its work to the general public, not only in the matter of wealth conservation but in the protection of the people's health as well. For example, it is not generally known that the serum transported by aeroplanes for the saving of life endangered by a recent occurrence of olive poisoning that attracted nation-wide attention, was the product of the veterinary laboratory.

Better known, of course, is the achievement of this particular branch of science that has given to the world the knowledge of the transmission of disease by insect carriers.

Very few communities and municipalities are today without their veterinary specialists. The rural district has its general practitioner, essential for the welfare of the section. The city has its veterinary bacteriologist, in whose laboratory are analyzed samples of products offered for human food. The States and National Government have large numbers of veterinarians trained specially for the detection of the diseases of animals and in the application of proper methods to prevent, control and eradicate such diseases with the view of protecting the livestock industry, an item of national wealth estimated at a valuation of over ten billions of dollars. The guarantee to the meat-consuming public that the animal products forming a part of its daily food are sound and wholesome is secured and delivered through the skill and training of veterinary scientists.

Viewing and studying the problems that confront the veterinary profession at present, can the veterinarian, regardless of his assignment, afford to remain aloof or ignorant of the various activities and factors that to a certain degree affect his chosen career? True, the scientist has but little time to devote to other pursuits. And yet, this is a sordid world, which often fails to recognize the true value of individuals and services, and unless particular attention is given to economic conditions by all classes of citizens, those of scientific attainments as well as the laborers and the business men, circumstances are very likely to be created which, while apparently of no moment, do not provide for a proper status of recognition and remuneration except to a favored few in each community. The veterinarians, particularly those in the employ of States, municipalities and the Federal government, know only too well the inconvenience, the struggle, to say nothing of the humiliation, caused by the inadequate rate of salary in effect in many of these positions.

In certain cases laws are needed for the proper consideration and recognition of veterinary services. In all instances, worthy principles and ethics, as well as constructive policies, must be adopted and maintained within the profession itself. Upright dealing and efficiency must govern. With these qualifications as standards the veterinarian need have no fear or hesitancy in bringing to the attention of those in quest of his knowledge the proper value of such services and the justice of adequate compensation. No reasonable objection can be taken if the veterinary profession as a whole is

forced to make use of appropriate actions to impress the true facts upon the officials having to do with legislation affecting the status of individuals and classes as well as the masses. Fair means of making clear to the law-makers of cities, States and Federal government the necessity for better protection against the encroachment of non-professionals in veterinary practice; recognition of veterinary science as being of a higher standard, and increased compensation for efficient and competent employees, should no longer be regarded as engaging in activities of a character detrimental to the dignity of our profession.

T. P. W.

### VETERINARY INTEREST IN ANIMAL HUSBANDRY

INCREASING evidence points to the need for veterinarians to have a well-rounded knowledge of animal husbandry. In its broad sense this includes the feeding, breeding, housing and general care of farm livestock. The recent meeting of the U. S. Livestock Sanitary Association reflects the sentiment that if veterinarians are to keep abreast of the times their knowledge of veterinary science must be reinforced with a knowledge of nutrition, breeding and related topics.

Certain diseases are now known to be closely associated with faulty nutrition, and veterinarians necessarily must recognize the extremely important part which feeding plays in the recovery of animals under treatment. Likewise in the field of breeding a few veterinarians have attained increasing recognition for their success by mere mechanical manipulation in overcoming sterility especially in cows.

The unusually large number of entries at the recent International Livestock Exposition indicates how greatly the number of livestock breeders is increasing. This condition certainly will lead to an insistence by owners that veterinarians called upon to treat valuable animals understand at least the broad fundamentals of livestock raising. The basic knowledge which veterinarians have of animal anatomy and the functions of organs should enable present practitioners to acquire the needed supplementary information without great difficulty. There are good books and bulletins on the subject. Livestock shows and the winter college courses are other particularly valuable sources of information. Already several veterinary schools, recognizing the signs of the time, have enlarged their courses to equip their graduates for meeting the situation. Establishing the

proper boundaries of the veterinary profession in this respect is a matter of utmost importance and deserving a place on the programs of future conventions.

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### BELGIUM ERADICATES RINDERPEST

THE latest official reports from Belgium show that success has been reached in eradicating the outbreak of rinderpest with which that plucky little country has been struggling for several months. From other sources we learn that the infection is supposed to have been introduced with an importation of zebu cattle from India last summer. According to the official reports the malady spread to 97 communes and attacked cattle on 279 premises. Besides 279 animals which died naturally from the disease, there were slaughtered 482 affected and 1,778 exposed animals, making a total loss of 2,539 head.

The Belgian veterinary service showed commendable energy and ability in dealing with the outbreak. The methods followed were similar to those employed in the United States in eradicating foot-and-mouth disease, namely, inspection, quarantine, slaughter and disinfection. The Government paid indemnity for slaughtered animals at the following rates: For affected animals, 70 per cent of the appraised value; for exposed animals ready for slaughter, 50 per cent, and for those not ready for slaughter, 70 per cent. In the case of exposed animals the four quarters of the dressed carcass, if passed by the veterinary inspector as fit for food, and the hide after disinfection, were released to the owner. For contaminated fittings and articles destroyed by the inspectors two-thirds of the value was allowed. All indemnity was forfeited in case of violation of the regulations.

We extend hearty congratulations to our professional brethren in Belgium on their splendid work and its successful outcome.

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*Hoard's Dairyman* says editorially of bovine tuberculosis: "The Federal Government and the State governments should be more liberal than they ever have been in paying for condemned animals."

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*Breeder's Gazette* says editorially that "good blood is not all," and tells breeders that "pushing the animals along and not allowing them to want are the main secrets of success. Starve them, and you will soon have only scrubs again."

## TRAUMATIC GASTRITIS IN RUMINANTS<sup>1</sup>

By D. H. UDALL

*Professor of Theory and Practice, New York State Veterinary College, Cornell University, Ithaca, N. Y.*

THE digestive tract of cattle is the seat of some of the most frequent and destructive affections that afflict the species. Indigestions due to a wide variety of causes are perhaps the most important of the group, and in intensive dairy districts they are the cause of considerable loss. According to Hess (Switzerland), one-fourth of the affections in cows are of the digestive system.

On account of the habit of cattle of swallowing foreign bodies, especially nails and pieces of wire found in the feed or picked up from the ground, they are frequent sufferers from the effects of internal perforation of the reticulum. These injuries may result in local inflammation and healing through which the animal may pass without developing serious symptoms, or from which it may recover after what is usually diagnosed as a severe attack of indigestion. Such cases result in a circumscribed adhesive chronic peritonitis between the reticulum and the diaphragm and to some extent other abdominal viscera. This may cause no further trouble. But in many cases the infection spreads during advanced pregnancy or following parturition, and the sharp body extends its fistulous tract, inducing serious and extensive lesions in adjacent organs.

Until recent years it does not appear that injuries from foreign bodies have been the cause of any serious loss to American owners of cattle. European literature on the subject is rather complete and indicates that their losses have been sufficient to attract considerable attention. In this country, since the use of wood and string has been supplanted to a considerable extent by wire, and the old-fashioned blunt nail by sharp ones, the number of fatal cases appears to have increased and to be still increasing. Our conditions and habits favor the occurrence of the disease. Frequent repairs on wooden stables and barns where nails are carelessly used and scattered about, dumping ashes in barnyards, throwing rubbish containing rotten boards and nails into pastures or yards, allowing wire fences to rust and fall to pieces without removal, the use of wire to attach tags to bags of cow feed and to bale

<sup>1</sup> Presented at the Fifty-Seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.



hay, and the frequent custom of leaving nails and wire in stables are sufficient to explain its frequency.

In view of the importance of this disease a study of 50 cases has been prepared. On account of the wide variety of lesions, symptoms and complications that develop it is not easy to make a systematic classification of all the facts. The customary textbook description under two distinct and separate heads, traumatic gastritis and traumatic pericarditis, simplifies the description, but does not correspond with the sequence of events as they actually occur. I have, therefore, used the term which applies to a lesion that is never absent—traumatic gastritis. Gastritis is always present on the peritoneal surface of the injured organ (reticulum), and it might be still better to use the term traumatic peritonitis, since the lesion and induced symptoms correspond more closely with those of peritonitis than they do with gastritis as commonly understood.

The following conditions, named in order of most frequent occurrence in this series, have been recognized:

1. Traumatic pericarditis and myocarditis.
2. Traumatic peritonitis.
3. Traumatic pleuritis.

Less frequent associated conditions are:

4. Splenitis.
5. Hepatitis.
6. Pneumonia and bronchitis.
7. Emphysema, subcutaneous and subserous.

Occasional secondary conditions are:

1. Pyemia.
2. Septicemia.
3. Mitral thrombosis.

It is possible to base this classification on the dominant lesion and its resultant clinical reaction. In each case two or more of these conditions are always present and no two have been found to be identical, though fairly uniform types are presented.

#### ETIOLOGY

1. Careless small farmers with whom the cattle industry is more or less of a side line are said to suffer most. Our experience verifies this claim to a slight extent. Four came from one small farm where repairs and building were conducted, and there were four instances of two cases from a single farm. In one of these the cows were

cared for by women, in another the cows had access to a badly disintegrated wire fence.

2. *Predisposing causes.*—The custom of cows of swallowing foreign objects, the small size of the reticulum, the honeycomb-like structure of its mucous surface, and the activity of its contractions, combined with any marked increase in the abdominal contents, form a combination of circumstances very favorable to perforation of the reticulum by any sharp object that it may contain. The anatomy of the forestomachs is such that practically all foreign bodies swallowed remain in the reticulum, where they usually rest in the lower anterior part adjacent to the pericardial sac. And it is this part of the reticulum that is most often injured.

3. *Seasonal occurrence.*—In estimating the seasonal occurrence the date of first call has been taken. They occur as follows: Seven in January, 2 in February, 6 in March, 5 in April, 6 in May, 3 in June, 1 in July, 1 in August, 2 in September, 5 in October, 9 in November, and 3 in December. In the third of the year, June to September, only 7 of the 50 cases are recorded. This is the period when in our experience indigestions in cattle are relatively infrequent. These facts support the general observation that advanced pregnancy and parturition aggravate the symptoms of traumatic gastritis. In the months of June to September there is little stable feeding and few cows are advanced in pregnancy.

4. *Pregnancy and parturition.*—In 18 the history is associated with advanced pregnancy or parturition. In some the observed symptoms date from parturition, but more often the animal has not been right during the period of advanced pregnancy, and the symptoms become aggravated after delivery. In 15 no definite relation was observed between the development of the symptoms and pregnancy; in 17 the evidence showed no connection with pregnancy. Two were males and one was a 10-months-old heifer.

5. *Age.*—The injury is about uniformly distributed between the ages of 2 and 8. Two were under 1 year and 3 were over 10.

6. *Foreign body.*—The lesion was found to be due to wires in 18, nails in 11, small pins in 2, and other bodies in 1. No (foreign) body was found in 7, and from 3 there was no report. As many as 19 short nails and wires have been found in the reticulum of one animal, and numerous short rusty wires have been found in a single pericardial sac.

In extensive abscess formation between the reticulum and diaphragm a small foreign body is not readily found. The abscess

may have ruptured, the pus escaped into the reticulum, and its cavity become filled with food. When the lesions and foreign body are small there may remain only a slight adhesion, with the tracks of the passage of the body represented by a small round fibrous cord. In extensive and chronic lesions a body may completely oxidize, or it may escape with the flow of pus when an abscess is opened.

To find the body most readily the carcass should rest on the right side; carefully remove the abdominal viscera with the exception of that around the anterior portion of the forestomachs, explore the contents of the reticulum from behind, and search carefully for the fibrous cord that usually unites the reticulum with the diaphragm. The size of the foreign body and the direction that it takes determine the character of the lesion and the entire course of the disease. Most often it passes directly forward and perforates the pericardial sac. When the perforation through the diaphragm is at a lower level the foreign body misses the pericardium and results in pleuritis, which is usually chronic and associated with extensive abscess formation and thoracic adhesions. Bronchopneumonia is an occasional complication. Gravitation downward and backward may lead to abscess formation in the region of the ensiform cartilage, circumscribed peritonitis, external rupture of the abscess and escape of the wire. In most cases a perforation of the reticulum that does not pass through the diaphragm leads to a more or less acute diffuse peritonitis. One wire perforated the abomasum through the reticulum, causing death in less than 48 hours. A long, sharp wire may injure both the peritoneum and pleura and induce an acute diffuse inflammation which takes a rapidly fatal course.

#### CLASSIFICATION OF CASES

Based on the lesion responsible for the dominant symptoms, the 50 cases have been classified as follows: Twenty-six pericarditis, 18 peritonitis, 4 pleuritis, 1 emphysema, 1 splenitis.

#### PERICARDITIS

*Symptoms.*—A study of the records indicates that in many cases there is a past history of indigestion, an attack of sickness of some kind, or unthriftiness over a period of at least one month. In the 26 there were 10 intermittent indigestions, 4 had been unthrifty, 1 had been uneasy at milking time for 2 months, and 6 were acute without past history. The course varies from 1 to 6 months.

The general attitude is similar in all forms, though it is most seriously affected in diffuse peritonitis. They tend to remain in one place, remain down much of the time, rise slowly, and walk slowly with a stiff or stilted gait. In some the elbows are abducted and trembling of the muscles behind the shoulder is not infrequent. In the latter stages weakness develops, there is a slight stagger when walking or they may fall and remain down unable to rise. This condition is observed in septicemia; when the body travels in the direction of the abomasum recumbency may occur from the beginning. Grunting with each expiration is frequent; it is most marked in peritonitis. In practically all there is depression, the back may be arched, the expression staring or painful. In peritonitis groaning, colic and uneasiness are more marked than in pleuritis or pericarditis.

The condition is usually poor with the exception of the more acute cases; in all there is a loss of flesh. Those which have a history of intermittent attacks fail to gain in condition when the acute symptoms recede; the cow appears better, but the loss in condition is progressive. The milk secretion is always affected; in the acute forms and peritonitis the loss of milk secretion is sudden and complete. The mucous membranes are pale whenever the lesions are well developed, but in a high fever they may be redder than normal. Congestion of the conjunctival mucosa may occur in septicemia.

Edema of the submaxillary region and along the ventral border of the neck and sternum occurs in this series only in traumatic pericarditis. In most cases the edema has not been observed until within a week before death. Swelling of the limbs has been observed in septicemia and pyemia and in one case of pericarditis with recovery.

Whenever the lesion becomes well marked, anorexia for food and water is complete; in those which improve, the appetite remains impaired for a long time; often the animal goes for days without eating.

The prevailing temperature in pericarditis is between 102 and 104°F. It has been found less than 102 in 6 and above 104 in 6. The higher temperatures are more often found in the beginning of the attack; as the disease progresses a lower temperature is recorded, and in the last 24 hours it is subnormal. Unless observations are made repeatedly one observes no distinct difference between the temperatures of traumatic gastritis and those of primary indigestions. It varies widely in different cases and in different periods of the

same case; very little reliance can be placed on the temperature reading as a means of diagnosis. A medium-grade fever is of some value when considered in conjunction with other symptoms. In peritonitis the temperature runs slightly lower; none above 104°F. were recorded.

The abdomen is normal or below normal in size; rumination, contractions of the rumen, and peristalsis are slight or entirely absent. In pericarditis, tympany or distension of the flank has not been observed. The feces are scanty and somewhat dry or normal in consistency. Involuntary diarrhea may develop as a terminal symptom.

Breathing is shallow, often abdominal in type; there is a long pause at the end of each inspiration, the expiration being short and accompanied with a grunt. In two there was a history of occasional cough, and in one a cough could be induced; it has been observed in absence of lung lesions, possibly as a result of congestion of the pleura.

An examination of the circulatory system reveals symptoms by which the disease may be readily diagnosed in practically all cases. Increased frequency of the heart-beat is one of the early characteristic changes. A record of 100 or more was found in about half of the cases, and in none was it less than 72. Pain on percussion over the heart can be detected in nearly all in which the animal is able to stand and have the front leg carried forward so that percussion can be applied directly over the heart. Pain is more marked in acute forms than where the lesions have developed gradually; the pericardium becomes thickened and an abundant fibrinous exudate has been deposited. Dullness on percussion is less frequently recognized, due to some extent to the fact that the examination has not been completed. Modification of the heart sound can be heard in practically all. In 15 it was reported as splashing (liquid), in 1 tinkling (fibrin with liquid), in 2 blending (fibrin with liquid), and in 2 diminished or absent (fibrin); in 1 the sound was increased, due to direct injury to the heart; occasionally it is most marked over the right side. Distension of the peripheral veins has been observed in a few; probably it is often overlooked.

The facts of chief importance in making a diagnosis are: Increased area of dullness on percussion; pain induced on percussion; sounds revealed by auscultation and the frequency of the beat. Edematous swellings in the submaxillary region; the neck and



sternum have not been observed in this series except in pericarditis. Swellings of the limbs have been of a pyemic or septicemic nature. Edematous swellings of the hind limbs developed in one case of pericarditis that recovered, and this was probably due to toxemia rather than to heart weakness. At the onset of a traumatic pericarditis it may be mistaken for a severe primary indigestion. This occurs when, regardless of the lesion, the cardiac sounds are not materially modified and the patient improves under the usual treatment. As the disease progresses, however, and with a recurrence of the acute symptoms, cardiac sounds finally reveal the real nature of the lesion.

Acute indigestions of advanced pregnancy not infrequently present the characteristics of traumatic gastritis, and unless the animal comes to an autopsy or distinctly abnormal cardiac sounds develop, an accurate diagnosis may be impossible. One case showing emaciation, diarrhea, staggering gait, apparent incoördination of movements, and final collapse was diagnosed as forage poisoning, but the autopsy revealed a pericarditis. With opportunity to make a careful examination or more than one observation, an error is seldom made. Tuberculous pericarditis or pleuritis, and mitral thrombosis may present a practically identical clinical picture—pulse of 100 or more, cardiac sounds muffled, blended or imperceptible.

The exact course may be difficult to determine; it has been estimated by the symptoms, history and lesions found on autopsy. In one it was 3 days, one 7 days, two 14 days, eight a month, five 2 months, five 4 months, and three 6 months. The course is shortened by mitral thrombosis, perforation of the ventricle (non-perforative injuries appear to be tolerated), injury to the auricle, by a concurrent subacute or acute pleuritis, or by a pneumonia.

*Lesions in pericarditis.*—Subcutaneous edema in the submaxillary and sternal regions is often found as a record of the terminal heart weakness. Purulent tendovaginitis was found in one case in which there was also a thrombus in both the right and left ventricles. In the abdomen the most constant lesion is a chronic circumscribed adhesive peritonitis between the reticulum and diaphragm within which one finds a cord-like sclerosis corresponding to the fistulous tract. Less frequently peritonitis is more extensive, involving the abomasum, parietal peritoneum, small intestines, spleen and liver. Abscesses are sometimes found in the thickened peritoneum, the spleen or liver, but they are more frequent in injuries that do not

involve the heart. The presence of quantities of straw-colored fluid (serum) in the body cavities is the result of a prolonged heart weakness in which subperitoneal and subcutaneous edema may also be found. Occasionally a pericarditis is combined with an acute peritonitis and pleuritis, both body cavities containing a sanguineous fetid fluid. A reddish serous fluid is often found in conjunction with abscess formation where its presence is explained by the peritonitis.

The changes in the pleural cavity are counterparts of those in the abdomen; the most frequent lesion is a circumscribed adhesive chronic pleuritis with or without abscess formation. Adhesion between the pericardium and diaphragm is always present. The pericardial sac is always greatly distended (18 by 12 inches) and may appear to occupy nearly all of the left chest cavity; occasionally it is partly necrotic as if about to rupture; it contains pus or fibrin, often both. The pus often amounts to 2 or 3 gallons. When the course has been shortened by concurrent acute diseases (pleuritis, peritonitis, cardiac injury, pneumonia) the quantity is less, but even then one may find a gallon if the course has extended over three or four weeks. In recovered pericarditis the epicardium is granular and the two surfaces may be partially adherent.

#### PERITONITIS

*Symptoms.*—The history is usually definite and short. Fifty per cent are associated with advanced pregnancy or parturition. There is marked depression and in the beginning pain is often manifested by uneasiness, kicking the belly and groaning. The animal is often recumbent and unable to rise; weakness is pronounced. The milk secretion shows a marked and sudden loss; all of the gradual losses in milk are recorded under other forms. The skin shows no evidence of edema in the submaxillary region, but in other places, especially the limbs, the subcutis or tendon-sheaths may be swollen and inflamed from septicemia or pyemia. The temperature is between 102 and 104° F. It seems to be slightly lower and less irregular than in pericarditis. The average heart rate is from 65 to 75, though in one that recovered it was 100 to 128. In all anorexia is complete and of sudden development. Occasionally the abdomen shows bloating; peristalsis and rumen contractions are slight or absent. Pain on percussion or palpation is found in about 50 per cent. When the foreign body is located at a considerable distance from the abdominal wall, as in gravitation toward the median or

the abomasum, it may be impossible to induce pain, and it is not readily brought out when the animal is in a recumbent or partially comatose condition. The feces are suppressed or scanty; in the terminal stage they may be thin, fetid and voided involuntarily (septicemia).

The breathing is irregular, varying from 12 to 36. Occasionally a cough or induced cough is found. This has been more frequent in cases that recovered when the diagnosis was less certain. Hematuria was an initial symptom in one recovered case. In 14 the course was less than 2 weeks, and in 3 less than a week; exceptionally it is 6 months.

*Diagnosis.*—It is interesting to note the diagnoses recorded at first call: Nine indigestions, 5 metritis, 1 dystocia (collapse), 1 hematuria, 1 traumatic pericarditis, and 1 suspected intussusception. In about 50 per cent the diagnosis was made with reasonable accuracy before death. Acute indigestion from overloading may terminate fatally because of a previous adhesion of the reticulum. The physical examination may fail to reveal symptoms other than those of an acute indigestion terminating in peritonitis. If the cow is also advanced in pregnancy a combination of circumstances exists that may be solved only by an autopsy. When migration is in a posterior direction in the region of the median line the symptoms closely resemble primary indigestion; the differential symptoms consist in persistence of a disease which can not be explained by the character of the food or feeding, a possible history of previous attacks, history of restlessness or pain, and the fact that very few primary indigestions run a course of one week.

Except in advanced pregnancy or overeating of spoiled food, both of which are easily determined, primary indigestion usually responds to treatment within 24 to 48 hours. When an acute indigestion persists for a longer period traumatic peritonitis may be suspected. Acute metritis following parturition may completely mask a traumatic peritonitis until revealed by an autopsy. Treatment of the uterus aggravates the peritonitis, the animal immediately becomes worse and the operator may be deceived with the belief that he has punctured the uterus and caused a fatal inflammation. Seasonal occurrence may be of assistance in eliminating a primary indigestion, the latter being of rare occurrence in pastured animals.

Hematuria associated with acute gastrointestinal symptoms at the onset of a perforation is very misleading; this symptom is some-

times associated with an acute gastroenteritis when it is usually explained by the presence of a secondary nephritis. Tendovaginitis and arthritis with a history of stiffness and loss of condition is not infrequently the result of a traumatic peritonitis. And various degrees of septicemia with or without edema and necrosis of the skin if associated with "chronic indigestion" suggest a traumatism.

Intoxication following perforation of the abomasum, and associated with collapse and straining in a cow due to freshen, may closely resemble the septicemia of an emphysematous or macerating fetus; careful examination of the genital organs, however, will exclude the latter. Other affections, such as mastitis or parturient paresis following parturition, may be so modified by a traumatic peritonitis as to present a confusing clinical picture until explained by an autopsy. Peritonitis due to necrobacillosis or to spontaneous uterine rupture with escape of the fetus into the abdominal cavity closely resembles traumatic peritonitis.

*Lesions.*—In cows that have died from peritonitis the most constant lesion is a chronic adhesive inflammation with abscess formation, to which is usually added an acute serofibrinous inflammation. A fistulous tract often leads from the reticulum to the diaphragm, less often to the liver, spleen, or in a posterior direction between the reticulum and abomasum. The abdominal cavity may contain gallons of a serofibrinous exudate, the latter causing extensive adhesions between the serous surfaces of the intestines. Not infrequently perforation of the reticulum is immediately followed by an acute diffuse fatal inflammation; in these cases fistulae and abscess formation are absent. In both forms the peritonitis of the intestines may be hemorrhagic and the mucosa affected with various degrees of inflammation.

Intercurrent indigestion in an animal affected with a chronic adhesion presents a marked overloading of the rumen and an acute peritonitis. On the ventral and anterior surface of the rumen one finds a fibrinous exudate and the abdominal cavity may contain a small quantity of serum. Metritis is the most frequent intercurrent disease; advanced pregnancy and parturition have "lit up" a chronic peritonitis and the supposed fatal inflammation of the uterus proves to be a mild metritis and a severe traumatic peritonitis. Septicemic lesions in the form of hemorrhages on the serous membranes, edema and hemorrhage in the subcutis, degeneration of the parenchymatous organs, and swollen hemorrhagic lymph glands are frequent. Pyemic tendovaginitis in the region of the fetlock, carpal and tarsal

joints is not rare. In conjunction with swellings of the skin one may find an edematous infiltration of the retroperitoneal and adjacent tissues.

#### PLEURITIS

Traumatic pleuritis is always chronic, with the few exceptions in which it is concurrent with peritonitis. It extends over a period of two to six months. The cow shows a gradual loss of condition combined with respiratory and digestive symptoms which vary according to the location and extent of the lesions (pleuritis, pulmonary abscess, bronchopneumonia, prolapse of reticulum into thorax, communicating fistula between bronchus and reticulum). A past history of stiffness is very suggestive. The temperature, even when taken repeatedly, may not register over 103° F. The pulse is about 75 and variable. The respirations are either normal or increased in frequency. Finally emaciation becomes extreme, but the animal retains such a remarkable tenacity on life that the final termination is usually by slaughter. In one case with a communication between the reticulum and bronchi, swallowed water was returned through the trachea until death from suffocation followed a hearty drink.

The respiratory symptoms are characteristic. In the presence of a large circumscribed abscess in the lung or pleural cavity there is an area of complete dullness on percussion which is sharply defined from the adjacent normal structures. Often there is also marked pain on percussion. In most cases injury to the lungs has resulted in a chronic bronchopneumonia as well as abscess formation, so that on auscultation one hears a variety of moist rales. Cough is always present in bronchopneumonia; it is frequent, painful, suppressed and easily induced.

*Lesions.*—In this form the foreign body misses the pericardium (small body perforating at a low level), so that the chief lesions are a chronic diffuse adhesive pleuritis with extensive abscess formation. Numerous fistulae leading to multiple abscess cavities are frequent. The lungs are partly hepatized and may contain large or small abscesses or be affected with bronchopneumonia. An acute diffuse pleuritis may be found as a terminal lesion.

#### EMPHYSEMA

Emphysema may become marked when a sharp body perforates the lung in such a manner that air escapes into the subpleura (interstitial emphysema). It extends beneath the skin, pleura, peritoneum,



and into the mediastinum, resulting in death in from one to three days. Again it may follow an abscess formation, extend less rapidly, causing death in three to four weeks.

The symptoms consist in a subcutaneous emphysema that extends over the entire body. Breathing becomes very labored and death results from suffocation. Two of the 50 cases belonged in this group.

#### SPLENITIS AND HEPATITIS

Splenitis and hepatitis may occur independently. In one case of multiple liver abscess combined with peritonitis and pulmonary abscess the pus contained numerous ray fungi (actinomycosis). Pain on palpation over the liver and spleen may be induced when the inflammation becomes well marked, and one may be able to locate peritoneal adhesions by means of a rectal examination. Pyemic arthritis and tendovaginitis resulted from a small circumscribed splenitis. The course was afebrile, death resulting from decubitis after about two weeks of progressive lameness and stiffness. There were no general symptoms until near the end.

#### DISCUSSION

DR. DEVINE: I question if there is anyone in the room who can add much to the discussion of Dr. Udall's paper, but as a cattle practitioner I feel that it would be an injustice to a man who has prepared a paper of such importance as Dr. Udall's if no one said anything either for or against it. If there is anyone here that is interested in this particular subject, or if there are some peculiar things that have occurred in their practice relative to digestive symptoms and pain, this is the time to discuss it.

Dr. Udall has done much work on this subject. His knowledge on it is thorough and practical. I know of no condition in cattle in which it is quite as hard to make a diagnosis on your first visit, as he points out, to determine definitely whether you have traumatic peritonitis, or whether you have simply an acute indigestion. The grunting on expiration that he pointed out to you is of great importance, counted with other physical examinations and clinical examinations. If you can eliminate by rectum or other manipulation other troubles, if you can eliminate invagination, if your history indicates that this is rather a hanging-on case, if you can eliminate sudden change of diet or distress caused by food, that grunt on expiration is one of great clinical importance. Don't overlook the difference between traumatic peritonitis and traumatic pericarditis. I hope that some of the men who are interested in this will ask some questions and discuss it.

DR. FOGLE: I would like to ask if there are any of the members who find it practicable to operate, whether the diagnosis shows a traumatic condition, for the removal of foreign bodies.

DR. UDALL: In talking to Dr. Ferguson yesterday he referred to the use of operation, I gathered, rather frequently for the relief of this condition when it was diagnosed early. I am sorry he is not here to discuss the subject, because he has seen many more cases than I have and has had much more experience with that phase.

CHAIRMAN BEMIS: We have had experience in two cases of this kind, and our experience bears out the statement just made by Dr. Udall that if an operation is to be performed it must be performed early. I believe not many of the cases will be diagnosed in the proper stage for operation. If they could be diagnosed early, there is no reason at all why the foreign body could not be removed if it is still present in the reticulum. One of these cases made a very nice recovery. The foreign body was a new ten-penny nail which had only partially penetrated and was producing the first acute symptoms. The other case died, and, being the operator, I like to think that it died because the process was already too far advanced to be relieved by the removal of the foreign body.

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### POST-GRADUATE SCHOOL

THE College of Veterinary Science of the State College of Washington, Pullman, Wash., again offered this year a post-graduate school for veterinarians.

This school extended over a period of four days, beginning January 10 and ending January 14, 1921. The principal men who aided with the conduct of this short course, besides the faculty of the College of Veterinary Science, were Dr. A. T. Kinsley, of Kansas City; Dr. W. H. Lytle, of Salem, Oreg., State Veterinarian of Oregon; Dr. B. T. Simms, Professor of Veterinary Medicine, Oregon Agricultural College, Corvallis, Oreg.; and Dr. W. T. Johnson, Experiment Station Veterinarian, State College of Washington, Puyallup, Wash.

The program contained a fairly wide variety of subjects that were of particular interest to the practicing veterinarians. These schools are conducted yearly and are intended for the benefit of the practicing veterinarians of the West. They are usually very well attended and have received splendid support from the veterinarians. This year the school was conducted under the auspices of the College of Veterinary Science, State College of Washington, Pullman, Wash., the Oregon Veterinary Medical Association, and the Washington Veterinary Medical Association. Each of the two associations chose representatives to cooperate with the college authorities in conducting this school and gave very splendid support to this movement.

E. E. WEGNER, *Vice Dean.*

## STUDIES IN INFECTIOUS ABORTION<sup>1</sup>

By I. FOREST HUDDLESON

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IT IS our desire to assist in clearing up many of the conflicting theories maintained by different investigators by presenting a brief discussion of several important problems in infectious abortion, which we have been studying at the Michigan Agricultural Experiment Station for several years, and the results thus far obtained. The compiled data from which this paper obtains will be presented in later publications.

The subjects presented in this paper are:

1. The immunization of non-pregnant cows and heifers against infectious abortion (caused by *Bacterium abortus* Bang).
2. The isolation and cultivation of *Bacterium abortus*.

From the viewpoint of the immunologist, infectious abortion may be considered a most perplexing problem, in that the infecting organisms may be present in the tissues of the animal without inducing apparent symptoms, or the symptoms, if manifested, may be followed by a number of disastrous secondary complications and sequelæ.

An effort has been made to study the efficiency of vaccines in controlling this disease by Bang (1) in Denmark, by Stockman (2) in England, by Giltner (3), Hallman (4) and Williams (5) in this country. Also the possibilities of commercialization have attracted many biological laboratories into the manufacture of various anti-abortion remedies, but their usefulness and value is greatly questioned, due to the absence of well-controlled experiments and observations.

The results obtained by European investigators from the use of large doses of living abortion bacilli on non-pregnant animals, in a way, appear encouraging, but the failure to mention the duration of time over which the observations were conducted, the number of cases of sterility which developed thereafter, or the number of animals which became carriers of the abortion bacilli after the inoculation of living organisms, makes the data somewhat difficult to interpret. The difficulty which one encounters in collecting experi-

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

mental data in the field, of course, is realized, but information concerning these subjects would be of immense value in judging the efficiency of a vaccine.

In this country the results obtained from the use of vaccine have not been altogether encouraging. However, this may be due to the small number of animals used in experiments of this nature and the failure to use control animals for comparing results.

Considerable stress seems to have been laid upon the use of massive doses of living abortion bacilli in immunization, the theory of which appears to have originated from observations of acquired immunity to this disease. In other words, it has been commonly believed by many that after the first abortion an animal becomes immune as a result of the presence of an enormous number of living organisms, but the harm which might result should the animal become a potential carrier of the organism appears to have been overlooked. From our present knowledge of the carrier state which concerns this disease, we know that *Bacterium abortus* may establish itself in the uterus for a short length of time and in the udder for a considerable length of time. In other words, there is established in the above-mentioned organs a state of equilibrium between the defensive forces of the body and the invading microorganism. This usually leads to a state of chronicity in which the infection does not progress or recede. It seems to us that the criterion for judging the efficiency of any abortion vaccine should be based upon the prevention of this condition as well as the more manifest pathological effects of *Bacterium abortus*.

During the winter and spring of 1917 an opportunity was afforded us for studying the effect of three types of abortion vaccine upon a number of animals in two different herds. One (to be designated as herd A) was composed of purebred Jerseys, Guernseys, Holsteins and Brown Swiss. Abortion and sterility had existed in herd A for a number of years and was causing considerable loss at this time. The other, herd B, was composed of grade Holstein heifers whose histories were known from the date of birth. Not one of the animals had ever given a positive blood reaction, nor had they ever been subjected to the abortion infection knowingly until this experiment was begun.

The animals in herd A were injected as follows: Four non-pregnant animals received subcutaneously (in front of the shoulder) 20 c.c. (100 billion) of living abortion bacilli in sterile physiological salt solution (type I vaccine). Thirteen non-pregnant animals re-

ceived 10 c.c. (50 billion) of killed organisms in phenol (0.5 per cent) salt solution, and after a lapse of seven days 20 c.c. (100 billion) of living organisms (type II vaccine). Twenty-six non-pregnant animals received three doses at seven-day intervals of 5 c.c. (10 billion) and 10 c.c. (50 billion) of a suspension of killed and 20 c.c. (100 billion) of living abortion bacilli. It is realized that the amount of inoculum, the number of injections and the interval between the injections are wholly experimental, but it was hoped that by employing several types of vaccines one might be developed which would be of some value.

The effects of the different vaccines in herd A were observed under natural conditions, while in herd B they were observed under artificial conditions, that is, as soon as conception was determined each of the animals was subjected to different methods of infection, as feeding, intravenous injection and intravaginal infections of living organisms.

An effort was made to note the local and systemic reaction of each animal, to isolate *Bacterium abortus* from the fetal membranes and uterine exudate following a normal parturition or abortion, to isolate *Bacterium abortus* and determine the presence of agglutinins in the milk of animals following parturition or abortion, to determine the blood reaction of calves from these cows at the time of birth, and to note any complications or sequelæ which are believed to result from the injection of killed or living cultures of *Bacterium abortus*. It is to be regretted that all of the above-mentioned conditions were not observed or complete data kept throughout the three years that these experiments were conducted, owing to the absence of the writer from the Experiment Station for about twenty months. However, there are sufficient data at hand to warrant a statement of the results obtained.

The calving and abortion history of herd A, beginning three years previous to the vaccine treatment and for the two years following, show that in 1914 there were 23 calves and 4 abortions (17 per cent); in 1915 there were 30 calves and 3 abortions (10 per cent); in 1916 there were 30 calves and 4 abortions (13 per cent); in 1917 there were 48 calves and 9 abortions (18 per cent); in 1918 there were 44 calves and 2 abortions (4.5 per cent); in 1919 there were 46 calves and 4 abortions (8.6 per cent).

About the time this experiment was begun a storm of temporary sterility invaded this herd, that is, estrum apparently occurred in the cows and heifers of breeding age, but they failed to conceive



except after several servings of the bull. We found that the failure of the Jerseys to conceive was partly due to a sterile bull, but we are at a loss to explain the failure of the other breeds to conceive. It is readily seen from the following data that the large percentage of temporary sterility did not occur in the treated animals.

During the year 1918, 40 of the treated heifers and cows and 19 untreated were bred, of which 35 of the treated and 6 of the untreated conceived. In the fall of 1918 a large number of heifers and cows were sold from this herd, including 14 of the treated animals. This left only 29 of the treated animals for observation for the year 1919. During the year 1919 there were bred 29 treated and 21 untreated animals, of which 29 of the treated and 14 of the untreated conceived.

In comparing the abortion rate of the two groups for the past two years we find no abortions in the treated animals and but two in the untreated in 1918; one in the treated and three in the untreated animals in 1919. In other words, there was a calving efficiency in 1918 for the number of animals bred of 88 per cent in the treated and 21 per cent in the untreated; in 1919, of 96 per cent in the treated and 52 per cent in the untreated animals.

These data apparently indicate a decrease in the abortion and sterility rate of the treated animals and a marked increase in the breeding efficiency of the treated over the untreated animals.

Our data show a very little increase in the specific agglutinins of the milk of several of the cows a short time after treatment. The milk from several of these cows was injected into guinea-pigs in the fall of 1919 with negative results. We failed to examine the blood of the calves from these cows for the presence of specific antibodies.

In herd B there were in all 15 heifers used, of which 6 received type III treatment of vaccine about thirty days before conception, 3 received an intravenous injection of 1 c.c. of a suspension of *Bacterium abortus* after conception was determined, 2 were fed living cultures of *Bacterium abortus* for a period of two weeks after conception was determined, and 4 were kept as normal controls.

Five of the treated heifers were subjected to periodical feedings after conception, and one was given several intravaginal instillations, before conception, of living cultures of *Bacterium abortus*.

Each of the treated heifers was bred some time during the fall and winter of 1917. One aborted (the heifer receiving intravaginal in-

stillations of living cultures) and one failed to conceive. Five were bred in 1919, of which all conceived and calved normally. Each of the 4 normal heifers was bred in 1917, of which 3 calved normally and one failed to conceive. The 4 were again bred in 1919 and calved normally.

Each of the infected controls aborted about ten weeks subsequent to the appearance of specific antibodies in the blood serum. The breeding efficiency of treated animals in 1918 was 66 per cent, and in 1919, 100 per cent; for normal controls in 1918, 75 per cent, and in 1919, 100 per cent. The abortion rate was 100 per cent in the infected control heifers.

Each of the calves born to the treated animals gave negative reactions to the serological tests at birth. Further, after repeated examinations (cultural and guinea-pig inoculations) we failed to find *Bacterium abortus* present in the milk of the treated animals, while on the other hand *Bacterium abortus* was isolated from the milk and from the aborted fetuses of the infected controls. The calves of the treated animals are all seemingly normal in appearance and have never been affected with white scours, pneumonia or other affections so often attributed to *Bacterium abortus*.

This summary of data gives only tentative conclusions as to the relative value of vaccines in the treatment of this disease. Its value should be gauged only by the failure of an animal to abort and the absence of subsequent harmful effects. It is true that we have many other secondary complications following the abortion disease, but these complications follow parturition in the absence of the abortion disease as well. So, to devise a system of vaccine treatment which would eliminate all the secondary complications which follow abortion or parturition in the absence of the abortion bacilli would mean an accomplishment never to be obtained in practice and hardly conceivable in theory.

The value of vaccines in the control of this disease can be determined only through carefully controlled experiments with a large number of animals. These data, while very suggestive, are too few to warrant final conclusions as to the value of vaccine treatment.

The difficulty which is encountered in isolating *Bacterium abortus* from infected material has many times led to erroneous conclusions. It is especially difficult to isolate *Bacterium abortus* from uterine exudate several days after abortion, or to determine its presence in milk by cultural methods, owing to the predominance of other organisms which are usually present in considerable numbers and

thus overgrow the inoculated medium. In fact, the only means which we have had in the past for isolating *Bacterium abortus* under such conditions was by guinea-pig inoculations. Even this method often proves unsuccessful when other bacteria predominate, as a guinea-pig will succumb to a septic infection.

The inconsistent results and the difficulty we have had in isolating and growing *Bacterium abortus* made necessary the development of a more reliable medium and method for growing this organism.

The factors which we have considered in rendering the isolation and cultivation of *Bacterium abortus* a comparatively simple process are the medium and its preparation, the proper reaction of the medium, the employment of an agent which will eliminate rapidly growing organisms, and the method of incubation.

After a series of experiments we found liver or spleen (bovine or porcine) infusion agar to be the most suitable medium for isolating this organism. The technique for preparing the medium is similar to already described methods for preparing meat and infusion agar, except that glass wool should be used in filtering. Previous investigations have shown that about half of the initial growing properties of media are removed when employing cotton, cloth or paper in filtration.

We find that the reaction of the medium is a very important factor in the isolation of this organism which cannot be overestimated. The reaction of amniotic fluid and meconium of several aborted fetuses as determined by the H-ion colorimetric method has been found by us to lie between a pH of 6.4 to 6.8, depending upon the lapse of time between the abortion and the titration. The acidity of these fluids decreases very rapidly on exposure to the atmosphere, as the free  $\text{CO}_2$  contained in the fluid volatilizes very rapidly. Other factors being favorable, a medium possessing an H-ion reaction between the above-mentioned limits will produce a luxuriant growth of *Bacterium abortus*.

We have succeeded in eliminating a large number of rapidly growing organisms from overgrowing the inoculated medium by incorporating in the medium a saturated aqueous solution of gentian violet in such a quantity that the final dilution of the dye is 1-10,000. The growth of *Bacterium abortus* is not in the least inhibited, but practically all of the other bacteria (especially Gram-positive organisms) fail to grow, owing to the toxic action of the dye. This method has been applied successfully in the isolation of *Bacterium*

*abortus* from infected milk, from the fetal stomach and from uterine exudate.

In the past it has been the custom to consider *Bacterium abortus* as an organism possessing peculiar biological characteristics with respect to oxygen. That is, a decreased oxygen tension has been considered necessary for its primary growth. Our researches reveal that its growth is not a question of oxygen tension, but depends upon an increased  $\text{CO}_2$  tension. The proper  $\text{CO}_2$  tension for the growth of this organism appears to exist in the gravid uterus and in the udder, but not in the non-gravid uterus. This may explain the failure of the organism to persist in the uterus for any length of time after abortion or parturition.

We have been able to arrive at the proper  $\text{CO}_2$  tension of the gravid uterus artificially by introducing different per cents (by volume) of  $\text{CO}_2$  gas into a series of closed jars, and estimating the change in reaction of the contained atmosphere by the H-ion colorimetric method. The jar containing 10 per cent of carbon dioxide gas gave the desired pH reaction of 6.6. Media inoculated with infected material and placed in a sealed jar in which 10 per cent of the air has been replaced by  $\text{CO}_2$  and placed in a 37° C. incubator will grow *Bacterium abortus* in from 24 to 48 hours. The growth will be luxuriant and the individual colonies very large, varying in size from 1 to 3 mm. in diameter.

Comparing the relative delicacy of this method with guinea-pig inoculations, it may be stated that in many cases the cultural method has proved superior in instances when there were only a few abortion bacilli present. However, the two methods agree very closely.

The results of this study may be summed up as follows:

1. The proper medium for the isolation of *Bacterium abortus* is liver infusion agar which has been prepared without excessive heating and filtered through glass wool instead of cotton, cloth or paper.
2. The growth of *Bacterium abortus* in culture is markedly influenced by the H-ion concentration of the medium. It is important that the medium be adjusted in terms of H-ion concentration.
3. The reaction necessary for the optimum growth lies between a pH of 6.8 and 6.4.
4. By incorporating a saturated aqueous solution of gentian violet in medium in sufficient quantity to give the dye a final dilution of 1 to 10,000 a large percentage of microorganisms occurring in infected material other than *Bacterium abortus* may be eliminated.

5. The most suitable method for growing *Bacterium abortus* is obtained by placing inoculated media in a closed chamber in which 10 per cent of the air has been displaced by CO<sub>2</sub> gas.

6. This technique, if carefully followed, yields results identical with the guinea-pig inoculation method for determining the presence of *Bacterium abortus* in milk or in infected material.

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#### FAUNA OF MONGOLIA

The fauna of Mongolia was described by Roy C. Andrews, explorer for the American Museum of Natural History, during a recent lecture before the National Geographic Society in Washington, D. C. Of particular interest were the antelopes. The explorer's party were equipped with automobiles with which they sometimes hunted. After running about a mile at the rate of 45 miles per hour, an antelope had no difficulty in increasing its speed to 60 miles per hour. This was judged from reliable speedometer observations.

The women of Mongolia are excellent horseback riders and can ride their ponies against any wind in spite of their very elaborate hair-dress which spreads from shoulder to shoulder.

The dogs were a savage lot because they are fed on human flesh. Dead bodies are tied to a rope, the rope is tied to the end of a cart, and the cart driven over the rough road out of town. When the driver is sure the rope has snapped, he returns to town. The dogs finish the job.

The party was well equipped with scientific apparatus, etc., suitable for careful observation. Motion pictures were shown of antelopes in flight. A casual glance was sufficient to show that they were running with remarkable speed; even the very young animals can do this.

W. N. BERG.



## INFECTIOUS ABORTION STUDIES<sup>1</sup>

By B. T. SIMMS and F. W. MILLER

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At the Oregon Experiment Station agglutinations using suspensions of *Bacillus abortus* (Bang) with serum from cattle in different sections of the State have given the following results:

1. With one exception herds in which abortion is prevalent show some positive agglutinations.
2. Where definite histories can be obtained the aborting cows give positive agglutinations in more than 95 per cent of the cases. Sometimes the reaction remains negative until just about the time of abortion but changes to positive in less than a week thereafter.
3. Herds with no abortions or retained placenta give almost uniformly negative agglutinations.

The correlation between abortion and positive agglutinations being so uniform, and attempts at isolating other causal agents being always negative, the conclusion has been reached that *Bacillus abortus* (Bang) is the principal cause of abortion among Oregon cattle. The term infectious abortion as used in this paper will refer to infection with this organism.

The object of the problem as outlined has been to find practical methods of herd management which will prevent the introduction of the disease into clean herds and which will build up abortion-free herds from abortion-infected herds. The work has been controlled and checked by agglutination tests, clinical observations at termination of pregnancy, and guinea-pig inoculations.

### METHODS OF SPREAD OF THE DISEASE

The following methods of spread of the disease have been studied:

#### *1. Uterine Infection Previous to or at the Time of Copulation*

Some writers have claimed that the infection either is present in the uterus at the time of service or that it is introduced by the bull during copulation. Were this true it might be expected that implantation of the ovum would be prevented in some cases, while in others early expulsion of the implanted ovum would occur. In either case the animal would be classed as a shy breeder.

In a herd where abortion is prevalent breeding records were tabulated. Eleven different bulls, all of which gave negative

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

agglutinations, had been used. It required 189 services to produce 111 pregnancies which terminated normally, or 1.7+ services per conception. It required 84 services to produce 43 pregnancies which terminated in abortion, or 1.9+ per conception. This slight variation is well within the limits of error.

#### 2. *By Service of Negative Bulls Which Have Served Positive Cows*

In this experiment 20 heifers were used. They were bred to five different negative bulls which had been bred to aborting cows with positive agglutinations. Each bull was bred to from 1 to 6 heifers. The majority of the heifers conceived promptly. They were not exposed to abortion-infected cows or premises after pregnancy began. All of them gave birth to calves that were apparently normal. Seven of these were not tested during pregnancy. The 13 that were tested remained negative until after pregnancy had terminated.

#### 3. *By Feeding Infected Milk to Heifer Calves*

Forty-six heifer calves have been fed milk from infected cows. *Bacillus abortus* (Bang) has been isolated from samples of this milk. These calves have had monthly agglutination tests. Heifers from positive dams are frequently positive at the time of birth, but all the calves in the experiment were negative before they had reached the age of six months.

There is a possibility of a quiescent localized infection being so small that a systematic reaction will not occur. Were this true the negative heifers might change to positive after pregnancy had taken place. Twenty-three of this group of 46 have terminated their first pregnancies. After being bred they were handled in such a manner that they were not exposed to infected cows or infected premises. All of them carried their calves full term and dropped calves that were apparently normal. Their agglutinations remained negative throughout their pregnancies.

#### 4. *Through Barn, Pen and Pasture Exposure of Pregnant Heifers*

Thirteen negative pregnant heifers were penned and pastured with cows which were infected. In some instances the cows aborted in the pens with the heifers. Of these 13 animals, 8 aborted and 5 calved normally. The 8 aborters gave positive agglutinations.

#### 5. *Through Barn, Pen and Pasture Exposure of Cows*

Four pregnant cows from an abortion-infected herd were placed in a herd of about 30 females. No agglutinations had been run

on this herd, but it had been under observation for two years and there had been no abortions. Three of the 4 added cows aborted. A young bull was bought and used for serving these cows, but they were kept in the barn and pasture with the other cows of the herd. The original herd was in three groups, a separate bull being used for each group. No new animals were added to any of these groups, nor were the bulls used for serving outside cows.

The results of this exposure were as follows:

The first abortion among the original cows occurred about ten months after the new cows were brought in and six months after the first abortion among the new cows. The disease spread gradually until some cows in all three groups were aborting. The relation of positions in the barn occupied by the different groups to the spread of the disease is of some significance. The infected cows brought in stood at the south end of the west row of stanchions. Group 1 stood in the other stanchions of this row. Group 2 stood directly across the alley from the infected animals, being in the south end of the east row of stanchions. Group 3 stood diagonally across the barn from the originally infected animals. The percentage of reacting cows in each group was in direct proportion to the proximity to the infected group. Four years after the infection was introduced the percentages of reactors were as follows:

	<i>Total number</i>	<i>Number reactors</i>	<i>Per Cent reactors</i>
Group 1.....	17	16	94
Group 2.....	20	11	55
Group 3.....	11	4	36

#### CONCLUSIONS

1. Abortion is not necessarily preceded by shy breeding.
2. Negative bulls which have been bred to positive cows have not spread the disease when mated with abortion-free heifers.
3. Feeding infected milk to heifer calves has not resulted in infection of these calves.
4. Barn, pen and pasture exposure of abortion-free pregnant heifers to pregnant and aborting cows has resulted in a high percentage of infection and abortion.
5. Barn, pen and pasture exposure of mature cows has resulted in the spread of the disease. The rapidity of spread seems to have been in direct proportion to the amount of exposure.

## RECOMMENDATIONS

The results obtained justify the following recommendations concerning control and eradication of the disease:

1. Abortion-free herds may be built up from abortion-infected herds by adopting methods of herd management which will prevent exposure of heifers after they reach sexual maturity.
2. Testing all cattle and eliminating the reactors will certainly tend to control and possibly eradicate abortion.
3. The most common method of spread is through exposure of cows and pregnant heifers to infected cows and premises. Cattle owners should protect their herds by not allowing exposure to any sexually mature cows unless it is known that these animals are free from the disease.
4. In buying females to be added to the herd, young unbred heifers should be preferred.

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DORSEY PARDONED

Shortly before Christmas, President Wilson granted a pardon to James J. Dorsey, of Gilbert, Ill., known as the "millionaire cattle king." Dorsey was sentenced to eight years in Leavenworth prison by Judge K. M. Landis after conviction for selling tuberculous cattle in Western States by representing them to be Government tested and free of disease. He began to serve his sentence in June, 1919. In July, 1920, the President reduced his sentence to four years, and now has pardoned him outright, causing Judge Landis to announce in the public press that he is unable to understand the circumstances surrounding the pardon of such an offender and that he is going to watch Dorsey's future activities with interest.

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The 1919 meeting of the International Livestock Show was made notable by the phenomenal winning of the breeders from the South, a section of the country that is rapidly coming to the front in the production of improved livestock. This year the awards were more equally divided, the northern breeders taking the bulk of the honors. Among the most prominent southern winners were Frank Schofield, of Texas, who had the Grand Champion Shorthorn female; Dr. J. I. Huggins, of Tennessee, Grand Champion Angus bull; Senator J. N. Camden, of Kentucky, Grand Champion Hereford bull; G. C. Parsons, of Kentucky, Grand Champion Angus female; and B. P. Evans, of Kentucky, who exhibited the Grand Champion Hampshire boar.

## THE HERD RESTRAINT OF ABORTION DISEASE IN CATTLE<sup>1</sup>

By JOHN P. TURNER, *Washington, D. C.*

SINCE 1900 it has been the writer's privilege to be attending veterinarian and animal husbandman to St. Elizabeths Hospital, which has a herd of 200 cows and 50 heifers.

This herd is maintained in a rather thickly populated area in the District of Columbia, there being practically no pasturage. A large exercising field of 30 acres is provided, in which there is no grazing but an abundance of shade against the hot sun of Washington summer.

The grain ration consists of corn meal, bran, and either cottonseed or oil-cake meal, depending on the season. Clover hay is provided throughout the year. Corn silage in very limited amount is fed for 7 months a year. Soiling crops are fed during the summer.

The cows are turned into the exercising field daily, save in very cold weather or during cold rains. During the spring, summer and autumn they are out save at the milking periods. Bulls are kept in box stalls in the bull stable, each bull having an outside yard with water trough. The milking herd is maintained in two modern barns with a capacity for 200 cows. Dry cows are stabled in a separate barn and have an exercising lot distinct and away from the milking herd. Calves are kept in large box stalls in the barn used for dry cows but do not come in contact with them.

Calves are allowed to nurse for 3 days after birth and are then removed from the cows and fed raw herd milk in specially constructed tin buckets which fit into the grain box of the calf stalls. Calves receive milk until 3 or 4 months of age, depending on their growth, but are encouraged early to eat a grain ration of corn meal and bran. When 4 months of age they are turned into a grass lot and fed grain and are kept outside save in the winter. When 6 months of age calves are removed to a farm in Maryland, where they are kept until they freshen with their first calf, and are then returned to the milking herd.

Nothing but heifers and 2 bulls are kept on the Maryland farm. The heifers are divided into 2 herds on this farm. All of breeding age (18 months) are kept in a pasture with a young bull; the younger heifers are in another pasture.

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.



The herd has had its share of the usual epizootic diseases.

When the writer began his work in this herd 20 years ago the Bureau of Animal Industry was combating an outbreak of rabies, and in making postmortems for this disease found the herd badly tuberculous. Later a tuberculin test was applied, and 79 out of 115 cows were destroyed. Barns, lots, etc., were cleaned and disinfected, and a fight against tuberculosis was begun, which ended successfully in 5 years.

Abortion disease had existed for many years, but was not given much attention, as all calves were vealed, the herd being replenished by carload purchases of cows from the mountain section of Virginia.

It was noticed at this early period that abortion was more prevalent among the newly purchased cows than among those which had been in the herd several years.

Additions to the herd were generally made at the end of the fiscal year in June, and from 20 to 30 cows were purchased after being tuberculin tested. These cows were either fresh or were forward springers. They were bred in September following purchase, and abortions were generally noted by February and March. Frequently from 25 to 50 per cent of these newly purchased cows would abort. The number of cows aborting annually would be 15 to 20. If the cows that aborted gave sufficient milk to warrant their retention in the herd, they were kept; if not, they were sold for beef. At this time (1900 to 1908) there were no facilities for caring for aborters, and proper isolation of them could not be maintained. Abortion to a certain degree was looked upon as a part of the year's loss to the herd.

In 1909, due to some sanitary requirements on this farm, the writer was enabled to get two box stalls at the end of an abandoned piggery for use as isolation stalls for aborters. Fortunately, these stalls were connected with concreted yards having sewer connections. Then we were able to control the spread of infection from vaginal discharge, as it was possible to secure infected placenta and burn them and disinfect the floor of this yard regularly.

The record of abortion disease in this herd is as follows:

<i>Year</i>	<i>Number of cows in herd</i>	<i>Number of abortions</i>
1900.....	115.....	10
1901.....	128.....	14
1902.....	135.....	16
1903.....	140.....	13
1904.....	145.....	12

<i>Year</i>	<i>Number of cows in herd</i>	<i>Number of abortions</i>
1905.....	155.....	15
1906.....	150.....	16
1907.....	145.....	20
1908.....	149.....	16
<sup>1</sup> 1909.....	150.....	11
1910.....	155.....	18
<sup>2</sup> 1911.....	145.....	14
1912.....	150.....	13
1913.....	152.....	9
1914.....	157.....	6
1915.....	169.....	3
1916.....	161.....	4
1917.....	192.....	7
1918.....	197.....	9
1919.....	202.....	4
1920.....	213.....	4

Owing to the increasing price of cows and the lowering of their quality, it was decided to raise calves and endeavor to build up the herd. In 1909 25 heifer calves were raised, and from that time from 25 to 40 heifer calves were raised each year. The last purchase of cows was made in 1911. Since that time the only additions to the herd have been young, registered Holstein-Fresian bulls and the annual crop of heifers.

It will be seen that the disease has gradually diminished and the herd has nearly doubled in numbers.

The cows purchased in 1911 aborted as usual in the spring of 1912, 12 of the aborters this year being among the cows purchased in 1911. The other was a heifer raised on the farm. To show the extent of abortions among newly purchased cows, during the years 1909 to 1912 there occurred 65 abortions in the herd; of these 61 were among purchased cows and 4 were heifers raised on the farm.

Since 1909 this herd has raised over 300 heifers with a total abortion among them of 41, or an average of 3.7 per year. These abortions occurred as follows:

First calf .....	4
Second calf .....	10
Third calf .....	15
Fourth calf .....	1
Fifth calf .....	4
Sixth calf .....	4
Seventh calf .....	3

<sup>1</sup> Began raising heifer calves.

<sup>2</sup> Last year cows were purchased.

Of these abortions 4 are second abortions. These second abortions occurred as follows:

- 1 cow aborted fourth and sixth calves.
- 1 cow aborted fifth and seventh calves.
- 1 cow aborted third and sixth calves.
- 1 cow aborted fifth and sixth calves.

While many writers state that abortion usually occurs at the first calving, such has not been our experience. Of the 4 aborting with their first calf, one of them occurred after a violent attack of some gastro-enteric disease which affected several of the heifers.

It is believed that the removal of these heifers while young (6 months) from the dairy farm in the District of Columbia to another farm in Maryland and their segregation from pregnant cows until fresh accounts for the low rate of infection. Dick (1) has also noted this fact.

That plenty of abortion disease existed in this herd is proven by the work done by Schroeder and Cotton in February and March, 1911, when they found abortion bacilli in the milk of 18 cows in this herd in one examination. The herd record of these 18 cows is as follows: Ten of them have either aborted prior or subsequent to this milk examination. Eight of these cows never aborted.

In September, 1916, the Bureau of Animal Industry made an agglutination test of the herd of 161 cows and found 33 reactors. During this year only 4 cows aborted. It is probable, however, that more of the disease existed in the herd, as several young calves died and some cows retained their placenta.

A record of these 33 reactors is interesting. Eleven of these cows have aborted either prior or subsequent to this blood examination. Nine calves born of these aborters have died when young. Twenty-two have never aborted. Eleven of these non-aborters have had 25 calves die when very young, as follows: One cow lost 4 calves when very young; 4 cows lost 3 calves when very young; 3 cows lost 2 calves when very young; 3 cows lost 1 calf when very young.

Twenty-one of these reactors have been sold as unprofitable milk cows since 1916; 1 died; 11 are now in the herd. Many of the cows that reacted have had from 4 to 7 normal calves.

From a breeder's standpoint it would have been better to slaughter these reactors which repeatedly produced calves that died when young, but as milk producers they were profitable, as a daily milk record has been kept for the past 10 years.

In connection with the agglutination test as a means of restraining abortion, Dr. E. M. Robinson (2) reports some very interesting work in a herd of 100 cows, heifers, bulls and oxen, in which 10 actual abortions had occurred previous to August, 1915, and 16 other cows were positive to the agglutination test. Sixty-three cows and bulls remaining as non-reactors were brought to the Experiment Station and put on a clean farm in August, 1915. By error a cow (No. 1148) had been included in the herd when removed; this cow had given a positive reaction in January, 1915, in dilution of 1 to 200. In August, 1915, she gave a positive reaction in 1 to 1,000 dilution. The reactor was removed from the clean farm after the first test on this farm, which occurred in January, 1916, together with 5 reactors of the original 62 clean cows.

A second test was made of this herd 2 months later (March), and 3 more reactors were removed and isolated with the previous 5 reactors.

A third test was made in May, 1916, and only 1 reactor was found and isolated.

A fourth test was made in July, 1916, and 2 more reactors found and isolated.

The remaining cows were then sent to a clean farm, and on August 17, 1916, the fifth test was made without any reactors.

The nonreactors were then removed to another farm, and two years later no further reactions have occurred either on this farm or among other clean herds into which some of them were introduced.

#### METHODS OF RESTRAINT

1. It is believed that it is necessary to discontinue the purchase of susceptible cows for aborting herds and depend upon bulls to raise the herd milk standard. In this manner a herd immunity is established.

2. Aborters are not to be sold unless they are without value for milk production.

3. The absolute segregation of aborters for a period of at least one month and longer if any vaginal discharge exists is the rule. The fetus and placenta are burned and the stall or place infected is disinfected.

4. The isolation from the milking herd of cows far advanced in pregnancy is practiced.

5. Heifer calves are fed raw herd milk. For several years, when abortion was very prevalent, all milk from aborting cows was fed to

calves without visibly increasing the amount of abortion disease. The fact that the majority of abortions in home-raised cows in the herd occurred at the third pregnancy rather precludes any danger from this source.

6. Heifers are maintained apart from the milking and pregnant herd and at 6 months of age are removed to another farm and are bred at 18 months and kept on this farm until fresh. This practice has been highly successful on this farm.

7. A grade bull is used on aborters and the calf sold for veal. This is done to save the time and annoyance of cleaning herd bulls.

Aborting cows as well as cows which do not pass their placenta promptly are hospital cases and are given uterine and vaginal treatment until they are clean.

Retained placenta are not forcibly removed. A suggestion made by Dr. Cassius Way has lately been tried and seems to be good treatment in these cases. A pint of mineral oil is introduced into the uterus at the twelfth, twenty-fourth and thirty-sixth hours, and gentle traction is made daily after the tail and external parts have been scrubbed and the vagina flushed with warm normal salt solution. These vaginal washings are maintained daily for at least 2 weeks and then every 2 or 3 days until the cow is clean.

Endo-metritis and cervicitis cases are treated with weak Lugol's solution with the Albrechtsen uterine catheters and local treatment of pure Lugol's to the os uteri when necessary, guarding the vagina with a cotton plug. An open capsule filled with iodoform and boric acid is introduced into the uterus if there is any apparent odor. Iodoform is never used in the milking herd, bismuth-formic iodide being substituted.

No anti-abortion vaccines or bacterins are used.

Drs. Mohler and Traum did a great deal of experimental work in this herd in 1910, using suspensions of killed abortion bacilli without conclusive results.

While this herd is not free of abortion, it is believed to be under practical control, the herd breeding efficiency being 80 per cent, 160 live calves having been born from 200 cows in the calendar year 1919.

The practical restraint of abortion disease and the total elimination of tuberculosis, together with the introduction of registered bulls of excellent producing families, have resulted in a marked improvement in the average production of the herd, which with 115



cows in 1900 produced less than 5,000 pounds of milk a year, while the present herd of 200 cows averages 8,000 pounds.

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#### DISCUSSION OF ABORTION PAPERS

DR. E. C. SCHROEDER (Bethesda, Md.): Dr. Turner told us that when the milk of these cows was examined it was found that ten of them had at some time aborted; eight never had. This illustrates in a splendid way that we should constantly keep before our minds that abortion disease may spread to apparently healthy cows. I can tell you of apparently healthy cows that have shown those symptoms and a large proportion of them disseminate abortion bacilli.

In regard to the paper presented by Dr. Simms, I wish to say that the etiological studies of abortion which have been in progress at the Bureau of Animal Industry Experiment Station for quite a number of years have given results which, had Dr. Simms used them for his conclusions, would have been identically the conclusions he has presented here today.

DR. C. W. EDDY (Cleveland): I would like to ask Dr. Turner one question. He has shown a great diminution in the number of abortions. I want to know about the number of retained placentas in cows.

DR. TURNER: I think during this year I have removed four or five placentas. A few will stand for ten or fifteen hours, but will not stand longer. In prior years I remember I had a job of that kind almost every visit. Now it is very unusual. The cows calve naturally; the calves are much healthier. The whole herd is improved in health, and where before we had difficulty in getting the number of calves, now we have success with them.

DR. FERGUSON: I would like to ask the Doctor what percentage of less than 280-day calves he had in that herd, and what per cent of calves have goiter, if any.

DR. TURNER: I have not noted goiter at all. As far as the per cent of 280-day calves is concerned, we find our calves come right up to the breeding dates. Three or four calves this year came at the period of about three weeks before their period, but on looking up the breeding records we found a service which corresponded exactly with that period, but they had been served the second time, showing that they possibly showed the first service. I think most veterinarians will find that both in cows and mares.

DR. WATSON: I would like to ask Dr. Schroeder a question. I think he has just drawn attention to the fact that apparently healthy cows are a danger and a possible source of infection. I would like to ask Dr. Schroeder if a cow that is being immunized with bacilli would also be a possible danger of infection.

DR. SCHROEDER: It is generally assumed that when abortion bacilli are

injected subcutaneously they do not permanently infect the injected cows. When those bacilli are injected intravenously they are likely to establish themselves in the udder. I object to either method in healthy herds because a subcutaneous injection may, at any time, unknown to the person who gives such an injection, become a partial intravenous injection.

DR. CONNAWAY: I wish to add a little experimental data to this matter of the retention of infection in the animal. I have injected a bull, as many others no doubt have, and I find that that animal retains that infection a good long time somewhere in his body. We had a little steer. We tested him and found that he was a nonreactor, and we injected him with the living cultures of the abortion bacillus. That was nearly a year ago. That little fellow is still a reactor. I believe that he has those abortion germs somewhere in his body and is producing the antibodies.

It may be that it is not necessary to have a living organism to produce antibodies. It may be that those have been encapsulated in some way and as dead antigens may be stimulating the production of antibodies and giving this reaction. I feel, as Dr. Cotton says, that it is a dangerous proposition to inject breeding stuff with the living organisms and risk those being killed and at the same time giving that animal any permanent immunity against this disease.

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### A NEW METHOD OF MILKING

DR. C. H. McFALL, of Florida, Ala., stands sponsor for the following story which was recently published in his local paper:

Atlanta has her gold-tooth baby and Dawson its two-headed calf and several other towns have recently reported freaks, all of which does pretty well for nature, but a man at Forsyth, Georgia, has eclipsed all in native genius. He has discovered a new way to milk a cow. He has trained his cow to give down her milk by the simple process of working her tail up and down like a pump handle.

He began his training by using one hand to draw the milk and at the same time moving her tail up and down with the other. In the course of a few lessons he would occasionally release the cow's teats and continue the tail movement and after a few days' time he could milk her "dry" in a short time with the tail.

He found it necessary, however, to always begin milking in the old-fashioned way. At first he was apprehensive of his success, because he was afraid his cow would milk herself fighting insects with her tail, but he has learned that, unlike a horse, a cow can switch her tail only from side to side.

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According to the *Wisconsin Farmer*, hog-cholera outbreaks have been noted in scattering parts of the State and local veterinarians are working industriously to stamp out the disease.

## A PRELIMINARY STUDY OF THE NORMAL VARIATION IN THE TEMPERATURE OF CATTLE<sup>1</sup>

By E. A. HEWITT

*Division of Veterinary Medicine, University of Minnesota,  
University Farm, Saint Paul, Minn.*

A STUDY of the normal temperatures of cattle and their variations was undertaken at the University Farm in hopes of shedding some additional light upon the subject. Few observations of normal temperature variation have been made on cattle known to be free from tuberculosis. A review of the literature upon the subject reveals the fact that the opinions are as numerous almost as the investigators.

Friedberger and Frohner as quoted by Wooldridge (2) consider 101.8° F. (38.8° C.) as the average temperature. They further quote Hadschopulo, who from 50,000 temperatures gives an average between 101.1° and 101.8° F. (38.4° to 38.8° C.).

Meade Smith (3) gives the average temperature for cattle to be 100.4° to 101.3° F. (38° to 38.5° C.). He further states that a variation of 1 degree or more indicates some failure in the organism or some departure from the natural process of metabolism.

Howell (4) in discussing the temperature of the human body states that the difference between early morning temperature and late afternoon temperature may amount to a degree or more Centigrade, which would be equal to 1.8° F.

From our observations we would conclude that the diurnal variation in individual cattle rarely exceeds that of a human individual or 1.8° F. But the range of variation of normal temperatures of cattle is greater than the range of variation of the human temperature.

Colin (5) and Thanhoffer (6) agree with Meade Smith and give the average temperature of cattle as 100.4° to 101.3° F.

Wooldridge (2) made 520 observations on 63 apparently healthy dairy cattle and found the average temperature to be 101.4° F. (38.5° C.). The lowest recorded temperature of the 520 was 100.4° F. (38° C.) and the highest observed was 102.8° F. (39.3° C.). He further states that these extremes are seldom met with.

<sup>1</sup> Published with the approval of the Director as Paper No. 217 of the Journal Series of the Minnesota Agricultural Experiment Station.

The writer made 490 observations on 70 head of purebred Hereford cattle which were in good condition, although not in show condition, and found the average temperature to be  $101^{\circ}$  F. The lowest temperature of the 490 observations was  $98^{\circ}$  F. and the highest observed was  $102.4^{\circ}$  F. This showed a wider range of variation by 2 degrees than was obtained by Wooldridge, the range in this case being 4.4 degrees, while that obtained by Wooldridge's observation was 2.4 degrees, the highest range of any one individual being 1.8 degrees. The temperatures of these cattle were taken after they had been stabled one day, as the average on the first day of stabling, shown by 210 observations, was  $101.8^{\circ}$  F. The lowest temperature of the 210 was  $100.4^{\circ}$  F. and the highest was  $103.6^{\circ}$  F. The higher temperatures in this case were due to the excitement of being stabled and tied up. These cattle were known to be free from tuberculosis.

The cause of the daily variation of temperature has been much discussed. There is no doubt that several factors are concerned, among the most important being the variation in the amount of contraction of the skeletal muscles and the influence of food. From our experience we are inclined to believe that heavy feeds are capable of raising the temperature considerably, especially in animals which are in show condition. More work on this phase is needed at present. \*

There is no doubt also that drinking water may cause a little reduction in the temperature, but under normal and accustomed conditions the reduction is slight.

Pregnancy is also said to cause a rise in temperature. Wooldridge in comparing the temperatures of pregnant with non-pregnant cows found the average temperature of the pregnant cows to be 0.3 degree higher than that of the non-pregnant cows.

Various other conditions are said to cause variations in temperature in health, such as active lactation, estrum, housing, and, as shown, excitement may cause a considerable elevation of temperature.

There is a great difference in individuals in the variation of temperature, there being a decided variation in certain individuals at the same hour on successive days, although we believe these cases are fewer in number than those which maintain a more constant temperature during the same hour of the day.

Following are the temperatures of cattle stabled in a modern barn, showing a range of variation of more than 0.6 degree. These temperatures were taken at 9:30 a. m. on each day.

NO. OF ANIMAL	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
283	100.9° F.	102.4° F.	101.2° F.	102. ° F.
279	102.	101.4	102.1	101.9
288	102.3	102.3	101.8	102.7

Animal 283 shows a range of variation of 1.5°. The conditions were the same each day.

The following table shows the temperatures of cattle stabled in the same barn as above, which show a more constant temperature, having a variation of 0.6 degree or less. These temperatures were taken at 9:30 a. m. each day.

NO. OF ANIMAL	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
295	101.6° F.	101.6° F.	101.5° F.	101.5° F.
281	101.6	101.4	101.7	101.5
Calf 297	101.5	101.4	101.4	101.9
Guernsey cow	101.3	101.3	101.4	101.5
Calf 293	101.6	101.6	101.6	102.2
Calf 298	101.4	101.8	102.	102.

The temperature of the stable ranged from 42° to 58° F.

The following table shows temperatures of cattle in another stable, which again shows that some individuals have a wider range of variation than others during the same hour. The first three series of temperatures were taken at 8:30 a. m. each day, while the last two series of temperatures were taken at 9:30 a. m.

NO. OF ANIMAL	NOV. 10, 1919	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
Calf 305	102.7° F.	101.8° F.	101.7° F.	101.9° F.	102. ° F.
285	102.2	101.6	102.4	102.	102.4
287	102.1	101.	102.1	101.6	101.6

The following table shows cattle having a fairly constant temperature confined in the same stable as those in the preceding table. On the first three days these temperatures were taken at 8:30 a. m., and at 9:30 a. m. the last two days.

NO. OF ANIMAL	NOV. 10, 1919	DEC. 22, 1919	DEC. 23, 1919	DEC. 24, 1919	DEC. 29, 1919
Jersey	101. ° F.	101. ° F.	100.8° F.	101.1° F.	101.2° F.
289	101.6	101.4	101.5	102.	101.8
280	101.9	101.6	101.8	102.3	102.5
300	102.4	102.	102.	101.5	101.9
286	102.2	102.6	102.7	102.1	102.6
178	102.3	102.4	102.3	102.5	102.4
Bull	102.2	101.9	102.1	102.2	102.



The animals studied in the preceding tables were all normal and in good condition, consisting of the experimental herd at the Veterinary Division of the University Farm.

Observations were made on 70 head of purebred Herefords in August, 1919, to determine the variation throughout the day. The average temperature of the 70 head at 6:00 a. m. was found to be 101.1° F.; at 8 a. m., 100.8° F.; at 10 a. m., 100.8° F.; at 12 noon, 100.9° F.; at 2 p. m., 101.1° F.; at 4 p. m., 101.1° F.; at 6 p. m., 101.3° F. The results of this observation do not coincide with the statement of most authors that the temperature is lowest early in the morning. However, this topic would merit further study.

The effect of watering animals in their accustomed manner was also studied. The animals observed were the veterinary experimental herd of the University Farm. These animals were accustomed to receiving all the water they would drink at about 10 o'clock in the morning. The temperature of each animal was taken at 9:30 each morning, one-half hour before receiving water, and beginning at one-half hour after receiving water, or 10:30. The temperatures were taken every half hour for three times. The temperature of the water averaged 43° F. The results are shown in the accompanying table:

Cow No.	Day	TEMPERATURE OF STABLE	ANIMAL'S TEMPERATURE AT 9.30 A.M.	LITERS OF WATER GIVEN	ANIMAL'S TEMPERATURE AT		
					10.30 A.M.	11.00 A.M.	11.30 A.M.
281	Mon.	45° F.	101.6° F.	20	101.8° F.	101.3° F.	101.2° F.
	Tues.	46	101.4	28	101.6	101.4	101.8
	Wed.	42	101.7	28	100.9	100.5	100.
283	Mon.	47	100.9	20	101.5	101.	101.3
	Tues.	49	102.4	28	101.	101.4	101.
	Wed.	44	101.2	28	100.2	100.4	100.
288	Mon.	48	102.3	20	101.3	101.5	101.6
	Tues.	52	102.3	28	100.8	100.6	101.6
	Wed.	47	101.8	28	101.1	100.6	100.7
279	Mon.	51	102.	28	100.8	100.7	100.6
	Tues.	54	101.4	28	100.7	101.	101.2
	Wed.	46	102.1	28	101.2	101.3	100.6
Guernsey E24192	Mon.	50	101.3	28	100.	100.	100.3
	Tues.	53	101.3	28	99.5	100.	100.4
	Wed.	54	101.4	28	100.6	100.2	100.4

A study of the table leads one to believe that if animals are watered in the manner they are accustomed to, and not allowed to become exceedingly thirsty, the effect of the water upon the temperature is slight.

#### CONCLUSIONS

1. That the normal range of variation in the temperature of cattle is somewhat higher than is usually given by most authors. In extreme cases there may be a range of 4.4° F.

2. That the average normal temperature of cattle is around 101° F.

3. That there are differences in individuals in their daily variation.

4. That water if given cattle at accustomed times and quantities usually causes little variation in the temperature.

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*Grove City National*, in commenting on the non-existence of county fairs, agricultural departments, purebred stock, etc., among the peoples of the 26th century, B. C., says: "Of necessity they had only low-grade livestock. There is, however, no justification for such livestock on the modern farm. If there is a scrub cow, hog, or sheep on your farm, list it as a poor investment."

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In advocating the passage of purebred sire legislation in Colorado, *Western Farm Life* says: "Experience in other Western States has shown that the only effective protection is to compel the use of registered sires on all open grazing land. Utah and Idaho are among the States that have benefited their cattle industry by such legislation and Colorado should no longer remain behind."

## KENNEL HYGIENE AND FEEDING<sup>1</sup>

By E. D. KING, JR., *Valdosta, Ga.*

UNDER kennel hygiene comes feeding, watering, exercising and housing, and anti-parasitic measures.

The feeding of dogs is a subject on which much improvement could be made over most of our present practices. The nutritive ratio best suited to the needs of the average dog is about one to five, and the average dog owner knows very little about what a dog should eat and never thinks of this until the dog refuses to eat. No attempt will be made to outline remedies, as the only sane procedure then is to call a veterinarian and he can determine what is wrong and prescribe suitable treatment, after which proper diet should be given.

The writer has obtained good results from feeding a ration of a mixture of prunes and wheat bran for breakfast, prepared as follows: Prunes, 1 quart; wheat bran (or shorts for pregnant bitches), 1 quart. Cook the prunes and remove the pits, mix the bran (or shorts) with the prunes, and add enough water to make a dough. Bake into a loaf and feed once a day ad lib. to effect, then every second day, substituting milk and corn-bread.

For the mid-day meal, ground lean beef and corn meal, equal parts, by bulk, cooked as follows: Cover with cold water and bring slowly to a boil, boil for twenty minutes, cool, and feed just what the dog will clean up well.

For the evening meal, restaurant scraps containing a liberal amount of meat will do very well.

These suggested meals will keep a dog in good shape, but many of my readers can substitute some local fruit for prunes for the laxative effect, which is essential to digestion and sometimes is all that is necessary to correct minor digestive disturbances.

Water should be kept in reach at all times and frequently changed so as to be kept fresh and the container clean.

Under housing, too much emphasis cannot be placed on the danger of digestive derangement that can be caused by chilling, and for that reason the following kennel is recommended:

No special form of kennel is necessary, but strips or wires should be placed across the top of the kennel at 3-inch intervals, and on each wire or strip should be hung a piece of burlap or flannel as

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

wide as the kennel, suspended by its middle and each end touching the bedding, and these should be split into 4-inch strips. Bedding on floor should be of excelsior or straw and covered with burlap or flannel. Door should be of canvas tacked at top and split half way up the middle from lower end, and across the wires or strips should be placed a sheet of heavy cloth to prevent draft. This arrangement permits the dog to go in and out without leaving the door open and keeps him covered so he cannot roll the cover (strips) off. In warm weather this can all be taken out.

Among important problems to the practitioner are the unhygienic handling of dogs in the field in hunting after the hunt is finished, and the erratic medicinal treatment attempted by breeders and owners.

Under the first usually a case of bronchitis results from hunting the dog hard and then putting him in an automobile and driving 10 to 30 miles without protecting him from the draft. This is very easy to handle, but the erratic treatment by owners and breeders is apt to be anything from bichloride poisoning, introduced in the shape of calomel and changed by combining with an additional atom of chlorine from the hydrochloric acid, which is marked in the dog's gastric juice, to feeding stale dog biscuits.

A favorite mistake is to assume that all the trouble with pups is caused by worms and when they seem indisposed fill them with patent worm remedies.

If we will consult Sisson, and look at the table of dentition for the dog, we will find that between 3 and 5 weeks of age a pup erupts 22 teeth. This causes more or less trouble, which is best treated by mild digestive corrective measures. Heroic treatments for parasites are usually disastrous. Five to seven months of age is another period of teething for the pups, during which mild treatments are to be recommended.

The subject of canine practice and kennel hygiene could be dwelt on indefinitely, but permit the writer to say in closing that our hardest patients to handle are in the hands of breeders. In these cases we should exact implicit obedience to instructions.

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Department of Agriculture Bulletin 855, entitled "Saponified Cresol Solutions," by Jacob M. Schaffer, describes experiments which show that saponified cresol solutions made with rosin soap have fully as great disinfecting power as those made with linseed oil or other vegetable oils or fish oil, and are much cheaper.

## THE HORSE AND THE MULE THEIR INDISPENSABILITY TO MANKIND<sup>1</sup>

By WAYNE DINSMORE

*Secretary, Horse Association of America, Chicago, Ill.*

I AM indeed glad to have the opportunity of addressing you, because I know that your members constitute one of the most influential bodies in the United States and that you are in a particularly strategic position to influence horse breeding and use.

The Horse Association of America is a non-profit corporation, organized under the laws of Illinois, supported by five great groups of interests and devoted to the work of aiding and encouraging the breeding, raising and use of horses and mules. At the conclusion of my talk, if you believe in this work, you are invited to take such action, officially, as you think should be taken to indorse it, and to select, in some proper manner, some representative of your Association to serve on our Advisory Board.

The American Remount Association has recently officially indorsed our work and has appointed Major Stanley Koch as its representative upon our Advisory Board. All of the great draft-horse record associations—the Percheron, Shire, Clydesdale, Belgian and Suffolk breeds—have gone in with us heart and soul, are supporting us financially and in other ways, and have designated responsible representatives from their directorates to act upon our Advisory Board. We have also been honored by the official indorsement and coöperation of the American Saddle Horse Breeders' Association, and more recently by similar action on the part of the Arabian Horse Club of America.

Very few farmers realize the great debt that they owe to the veterinary profession. No country is so free from disease as this one. In none is there so slight interference with interstate commerce or free shipment from place to place as here, and that is due to the splendid preventive work of the veterinary profession of this country. I know that, as time goes on, the livestock breeders will measure your work and estimate it at more nearly its true value.

Coming directly to the subject of "The Horse and the Mule—Their Indispensability to Mankind," I am going to deal with this from a very practical standpoint, because I know you men are

<sup>1</sup> Address at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.



interested in it from that standpoint. I have talked with many veterinarians in the Central West and they tell me that practically one-half of their annual income comes from their work with horses and mules. While that may not be true in all sections, it is certainly true in the Central West. In other words, you gentlemen have a direct financial interest in the production and use of horses and mules, and because of that direct financial interest I want to deal with this from a purely practical standpoint.

Since civilization began, the horse has been the servant and companion of man. His speed served the earliest peoples who lived by their horses and flocks; his power and docility aided in the first crude attempts at agriculture and transportation; his courage and strength won battles and decided wars. From the very beginning the nations that have possessed ample resources in horse flesh have been the dominating nations of the world. And even in the last great titanic conflict, where aeroplanes and every conceivable type of mechanical motive power were utilized to the limit, it was still found necessary to rely upon horses and mules to the extent of one for every four men engaged in combat. It is safe to say that in this war, as in previous ones, the presence of ample reserves in the shape of horses and mules decided the day.

The horse-breeding situation in this country in recent years has been complicated. Just before I came up here I talked with Dr. Reynolds, and I asked him, "What is the situation in Minnesota?" He answered, "There is a general feeling of uncertainty among our farmers. They do not know what the future has in store for them." I asked, "How many of your veterinarians have the necessary information to tell your farmers what horses and mules are going to do in the future?" He said, "Very, very few of them have facts and figures, or know where they can get them."

No industry in America has been so lied about, no industry has had so much erroneous information distributed about it, as the horse and mule industry in recent years. The incoming of mechanical motive power has led the makers to spread propaganda widely over this country. Much of it has been misinformation and much of it has been plain lies. They have sought to lead the city man to believe that the horses and mules were not economical or efficient in city work, and have told them that farmers were quitting the raising of horses and mules, and that they, city users, should quit using the horse and use mechanical motive power instead. And they have gone to the farmers and said, "Horses and mules are not

being used in the cities any more. You had better not raise horses and mules." So they have played both ends against the middle. That is not legitimate propaganda or legitimate competition.

Only last November the *Scientific American*, a reputable journal in New York City, ran an article in its columns, practically a full-page article, which contained more absurd and ridiculous statements about horses and mules than anything I have ever read. It started out with the general premise that there were so many tractors in general use in this country, and that every one had developed 13 horse-power at the draw-bar. The article went on to say that there were displaced by tractors on that basis, within the last four or five years, something like 4,862,000 horses and mules, and that at this rate all the horses and mules in the United States would be displaced and turned out to graze with nothing to do in a very short time. When I read that editorial before the Association of American Engineers they simply laughed at the thought of a tractor developing 13 horse-power at the draw-bar, displacing 13 horses per tractor on farms. Records show that tractors have displaced only 2.4 horses per tractor, and that on many farms the displacement is practically nothing. Furthermore, men are learning, as they use tractors, that they are not as economical, not as efficient, and not as reliable as the horse. The best friend the draft horse has in the country is the man who has used a tractor four or five years. (Applause.)

In 1914 the war came on. There was general uncertainty. Late in the fall of 1914 army purchases began, and in 1915 and 1916 these purchases continued at a rapid rate. Those purchases disclosed unexpectedly large numbers of horses ranging from 1,200 to 1,400 pounds, particularly suitable for artillery and transportation use. Of course they used the horses running over 1,500 pounds for transport. It also revealed an apparently unlimited supply of horses under 1,200 pounds. The ranchmen became discouraged. They said, "We have more horses than we dreamed we had. We had better not breed any more."

Today the advance census reports show that there has been but a slight increase in horses during the last decade, and a substantial increase in mules. In 1910 we had over 27½ million horses, mules, asses and burros on farms and in non-agricultural service. If the later figures bear out the advance census reports so far received, we shall have a little over 28 million head when the 1920 census data are completed. Aside from this we have exported during the last ten years 1,149,763 horses and 376,836 mules. Yet today, in spite of the

existence of approximately 27,000,000 horses and mules, there is a greater shortage of high class, 100 per cent efficient horses and mules than at any time in the past, because for the last three years breeding in the important horse and mule producing States has been practically at a standstill. This can mean but one thing—a shortage in the future.

Dealers, beset on all sides by city transportation users who want good, big draft teams, go into the West, find teams on farms that are suitable in size, age, conformation and quality for their needs, and say to the farm owners: "We want this team, and we will pay you \$650, \$700 or even \$800." The farmer says, "I can't sell them. I haven't any young horses to take their place." That is the situation today. So today we are confronted in the city with a lack of horses. The farmer has no young horses to take the place of the old ones, so our whole problem is increasing production and particularly increasing the immediate supply.

What is the situation in relation to horse and mule production? Pennsylvania and States east and north are largely a consuming area. They do not produce in that district one-fourth of what they need. The area south of the Ohio River and east of the Mississippi, with Arkansas and Louisiana thrown in for good measure, is another great consuming district. They don't produce one-eighth of the animals they actually use. The Central West States—Ohio, Indiana, Illinois, Iowa, Missouri, Oklahoma, Kansas, Nebraska, South Dakota and North Dakota—constitute the great producing district for draft horses. In that area they produce over 80 per cent of our draft horses and mules, and probably that percentage of driving and saddle horses. The great producing areas in Minnesota, Wisconsin, Michigan and the Virginias produce a slight surplus, but very few of the kind in demand. They do produce somewhere near what they need.

The belt lying along the eastern slope of the Rocky Mountains—Texas, Colorado, Montana and Wyoming—constitutes another district of distinct type in our horse and mule production, for they do produce a surplus. They have conditions that are ideal from the standpoint of producing good horses and mules, yet they produce very few horses that will measure up to the draft standard. Why? Because they have not a sufficient food supply out there to permit those animals to come to real draft standard. They may have colts dropped on the range that carry four crosses of draft blood, yet because they live on the open range, without a bite to eat except

what they themselves can get on the range, they do not have sufficient food supply to mature to the full size their blood warrants. Most of them do mature at from 1,300 to 1,500 pounds. The same applies to saddle and driving horses, which are retarded because of lack of feed. In Texas the conditions are still more unfavorable. An owner told me he had shipped 500 grade draft mares up from Texas to Colorado, keeping an equal number for breeding in Texas. Those kept in Texas matured around 1,100 to 1,200 pounds, and those sent up to Colorado grew up to 1,500 pounds. The same thing is true in cattle as in horses.

The breeders in Wyoming, Montana and Colorado have used good purebred sires for the last 20 or 25 years; yet those horses, if left on the open range, will not mature at more than 1,400 or 1,500 pounds. Those same horses, however, if taken into the Corn Belt as three-year-olds and worked on farms where more ample food supplies are available, will mature at 1,600 or 1,700 pounds, increasing in height, weight, strength and value while doing farm work. The existence of considerable reserves in these Western States is therefore an important source of immediate supply for us.

The farmer in the Corn Belt, the buyer of western mares, should buy mares that will stand 16 hands and 1,200 pounds or over at 3 years of age, because we know from past experience that if such young mares come to the Corn Belt, they mature around 1,600 and you have a gain all around, because farmers are displacing their mature animals with these younger animals. At the same time the older ones are sold and the farmer is thus furnishing a supply to the dealer, who in turn passes them on to the city users. The city user gains in getting a supply of mature draft horses just at the age he wants. The farmer gains because he sells his draft horses before depression sets in, and buys younger horses that he can work. The western man gains because he sells those animals at an age that suits him, leaves him profit, and they go on where they will grow out better than on the western range; so that is the way.

We must come to an increased production in breeding, which you are in a position to influence in a very marked way. Those of you who are actually out in practice know that the farmers are very uninformed upon the facts about horses and mules today.

Coming to the city situation, we have two problems, one to increase the use of horses and mules, and the other to increase the production of the animals. What is the situation in the city? Within the last three months the American Horse Association has



had investigators at Boston, New York, Philadelphia, Chattanooga, Memphis, Birmingham, Atlanta, St. Louis, Kansas City, St. Joseph, Omaha, St. Paul and Chicago as well as in San Francisco. We have had trained men digging into the situation in all of those cities, and what do we find? We find that there has been a great displacement of horses in the last ten years. There is no argument because the automobile has come in and wiped out the driving horse. Many men who would drive horses can not do so because of the slipperiness of the streets and because there are so many automobiles. On top of that you have the inclination of the average American wife or daughter to insist on an automobile if the next-door neighbor has one. You have also the inclination of people to have their pleasure, no matter what the cost. You know, as I know, that when it comes down to a question of pleasure there isn't one person in a thousand that will count the cost. There would be fewer divorces if they did.

What do we find to be the situation in these cities? We find a great displacement in horses, beyond what it should be. In New York they lost practically one-third of their horses in the past three years, 1916 to 1919. In Chicago the number dropped from 80,000 in 1911 to 40,000 this year—cut squarely in half. The displacement has gone beyond what it should, and men who are using both teams and auto trucks are finding that they can do the work more economically with heavy truck teams than with auto trucks. I won't go into all these reports. I have hundreds of them. In every case we went to the head of a firm and got the information from his records and submitted it to him and had it signed before we used it.

In summarizing, I would say the situation in the cities is this: On all short hauls, or rather on all hauls within a horse's working radius, which is within 12 miles—25 miles a day—where low cost of moving heavy freight is the prime consideration, horses are more economical, more efficient and give better satisfaction. Also on all frequent stops, such as milk wagons, grocery wagons, etc., the horse is more efficient and more economical, and they are increasing instead of being reduced in number.

We also find there is a desire among the city transportation users to have the facts. They have been fed up with the motor side so long that they don't know what the real situation is. No organization, prior to this, has dug out these facts and put them before city team users, but we are getting the facts and are putting them out in leaflet form.



We have not only had investigators in all these cities, but have also had a trained horseman visiting the farms all through the important horse-producing area. We have found that farmers generally are in an uncertain frame of mind. They don't know what the future is, and have been led to believe that there isn't going to be much market for horses or mules in cities or on farms.

We are working in various sections through our publicity campaign. We are reaching 1,500 newspapers with news letters every week, and all of the trade papers. We are offering prizes at the leading country and district shows, extending from Maine on the East to California on the West, and in that classification we have said, "Teams, to compete, must stand 16 hands in height and weigh 3,200 pounds per pair, and be driven by a driver under 18 years of age." Horsemen have said that is the best step taken for years to set a standard. We have also offered prizes on mules throughout the Southern States.

Then we have the question of schools and colleges. I found one of the professors in agricultural engineering in one of the eastern colleges was traveling around the State advocating that men should sell horses and buy tractors whenever a tractor would displace two horses, even on 60-acre farms. That is ridiculous on the face of it, because the most exhaustive studies made by the Farm Management Department of the University of Illinois showed that on all farms under 260 acres horses furnished the most economical and reliable source of power, and on farms over 260 acres 75 per cent of the work would still be done most economically by teams.

We have a royal fight on our hands; don't forget that. The motor interests spent \$18,000,000 last year in 25 magazines alone. They have sought to discourage production, because they know if they can discourage the rearing of good horses and mules city men can't buy them and will be driven to auto trucks. An instance of that kind occurred in Philadelphia. A department store had let their horses run down and the traffic manager was sent out to buy horses. He came back and said he could not get the kind of horses he wanted except for a certain sum which he thought was high. The directors said, "Let's switch over and motorize our whole delivery equipment." That department store has gone to trucks. In time it will learn its lesson, just as a department store in Chicago has learned that horses are more economical and recently offered for sale 19 auto trucks and bought 50 draft horses. I can't give you

the name of the store, because they are afraid of the influence of the motor interests. They have reason to be afraid.

A well-known newspaper two years ago threw out trucks and put in horses. They saved \$30,000 the first year by doing it, for the horses did that work for \$30,000 less than it cost to do it with auto trucks. We gave publicity to that, and the motor interests went to the newspaper and said, "Stop that publicity, or we will withdraw all of the advertising we have with you." The newspaper representative said to us, "We can't let you go on with that. It is true, but we can't afford to lose all that advertising." That is what they are willing to do. That is what we are up against.

Our idea is, in a nutshell, to get the facts about horses and mules in the country and cities, and put them before the people interested, directly or indirectly; and our one great problem is to prove to average farmers that the raising of good horses and mules is most economical. Gentlemen, you have every chance in the world to prove to the farmer that he can get all the motive power on his farm at no cost at all. All he has to do is to keep enough big draft mares to handle his year-round work, and then buy some extra teams in the spring to tide him over the peak load in the spring and summer. These motor people say, "You must have emergency power, and consequently you should buy tractors for that purpose," but that is not necessary.

What is the best emergency power to tide over the peak load of the spring season? A pair or two of good, big mules is the best thing you can buy. You can purchase those big sugar mules late in the spring at \$500 or \$550; put them to work, and in the fall you can sell them for a good deal more than you paid. D. E. Van Pelt, of Iowa, bought two pairs in the spring of 1919, worked them all summer, put them through heavy work, and in January, 1920, after all the fall work was done, he sold them for \$1,700.

A mule is the only fool-proof tractor ever built, the only motive power that you can absolutely depend on, that you will get a spark out of every time you come down with the whip, the only kind of motive power you can send to the field and rely on the mules coming back whether the man does or not. That is your practical motive power.

This is one of the big national problems we have before us today, because if you are going to displace horses in the cities and towns and villages and in the country, by replacing them with mechanical motive power, it simply means you are drawing more labor into the

iron mines, coal mines and everywhere else, where men are being drawn to those big centers to produce motors, tractors and trucks. If this continues, eventually you will have a condition in which the factories and cities will dominate our whole country. If such a change comes, industrialism will triumph, and the whole course of our national life will be changed. For a nation dominated by manufacturing interests soon seeks to buy foodstuffs in the cheapest markets of the world, regardless of injury to its own agricultural interests, and this brings about such profound changes that no one can foresee the end.

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### NEW YORK COLLEGE IN NEW QUARTERS

Dean W. Horace Hoskins announces that through the gifts of Charles M. Schwab, Dr. John P. Munn, and Miss Jenny Young, the Veterinary College of New York University, the oldest institution of its kind in the country, is now housed in new quarters in the two four-story buildings at 331 East 26th Street, New York. Hitherto the college used the hospital and ambulance of the Society for the Prevention of Cruelty to Animals, but now it will be able to work independently.

The new quarters will contain an animal clinic with rooms for blacksmithing, box stall for animal observation, anesthetic and operating room on the first floor; a library of 4,000 volumes donated by Alexander Liautard, founder of the school, and an anatomical museum on the second floor; lecture and demonstration rooms on the third, and a capacious anatomic laboratory on the fourth floor. A new feature of the school will be the pharmacy department where students will learn to prepare their own prescriptions.

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Dr. C. W. Tittle has just completed a modern veterinary hospital at Bartlesville, Okla., and is looking for a partner to assist him in taking care of his large practice.

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Dr. W. A. Boucher, of Pasadena, Calif., has just built a fine small-animal hospital. This is a two-story concrete building, heated by gas radiators. Kennels and yards in the rear are surrounded by a solid concrete fence. There is also a screened "sun parlor" and special distemper ward. Doctor Boucher is one of the leading practitioners in Southern California and takes an active interest in civic affairs.

## SOUND LIVESTOCK LAWS FOR THE FARMER AND THE VETERINARIAN<sup>1</sup>

By H. H. HALLIDAY

*Commissioner of Animal Industry, Lansing, Mich.*

THE privilege of addressing an organization such as the A. V. M. A. is a distinct pleasure and pride. The wheels of progress are turning so rapidly, so much is being learned and accomplished today that never was dreamed of before, that your profession is necessarily a part of the great improvement, and so well have your members responded to the call for painstaking, efficient service that every observing layman can point with pride to the work you are doing.

The old-time horse doctor is no more. He is not wanted or tolerated, because you have shown people the workings and results of the scientist and skilled veterinarians. A thousand avenues of assistance to the livestock industry and to humanity have opened up during the last few years because of the progress made in your profession. You have a right to be proud of your work, and I congratulate you.

As you continue to uphold the dignity of your calling and venerate the achievements, present and past, just so surely will you rise to the honorable station you deserve.

The ethics of your profession should be so fine that laws would be little needed for your guidance, because the absolute honesty and ability would regulate a large majority of your practices; but, unfortunately, human nature is still to be reckoned with, and a well-defined course of action is necessary, not only for the safeguarding of the public, but of your own interests as well.

Laws are recognized to be edicts which are right and just and necessary to the well-being of humanity. They can be obeyed and enforced only as they represent the will of the people and aim at justice and helpfulness. Punishment is just when it follows the disobedience of these laws or is inflicted to secure obedience, and so prevent the evil consequences of disobedience. The necessity for laws governing livestock is no different from that in other lines of human activity, but they are just as important. Laws that are a benefit to the producer of livestock must necessarily be a benefit to the whole country and to the world at large and the

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

wealth and health of many millions of people rest upon sound, wise laws and careful obedience to them.

Sometimes laws seem to be a hardship from one certain viewpoint, but let us always get around and take a view from some other angle and the justice of the matter will often appear very forcibly. Also let us remember that it sometimes takes a real friend to be cruel. So that some provisions necessary to the public at large are only the kind hands of friendship and not personal hardships.

Livestock sanitary laws are necessary to guarantee to the breeder and farmer security against disease; and in these days of increased value of farm animals this is fast becoming a serious problem and one that can only be met by efficient veterinary service and laws governing the care and shipment of livestock. These laws are of far-reaching effect upon the health and wealth of the nation. In order to have healthy, virile people, they must be well fed and nourished, and practice and custom have established meat eating as essential in our varied climates. The vegetarians have much force in their contention against the practice, but meat consumption continues with great increase. Milk is also one of the essential foods in the growth and development of the young and should only be used from animals which are known to be healthy. Animals are becoming higher priced all the time, and consequently more care is exercised in their health and handling. The preservation of the livestock industry is also essential in maintaining the fertility of the soil, thus keeping an intimate relation between the various branches of farming.

Laws should deal rigidly with shipments from State to State regarding contagious or infectious diseases and should also define accurately the duties of persons engaged in handling such traffic. All carelessness and indifference should be eliminated and provision made for quarantine of all livestock and stockyards where contagion exists. All farms and adjacent property should be held under restrictions wherever communicable diseases occur.

The laws should be concise, definite and uniform throughout all the States, thus simplifying the work of enforcement and rendering an easier understanding by those who should obey them. We realize that certain conditions, as soil, climate and prevalence of certain diseases peculiar to those conditions, would necessarily vary the laws to some extent, but many laws could be more uniform to the great advantage of all concerned.



Unfortunately, some of our laws are so worded that one section seems to conflict with another, leaving a doubt, even in the mind of an attorney, as to what the real provision is. Let us have them simplified and more definitely stated. Your profession is entrusted largely with the matter of formulating these laws, and you see the far-reaching effect of your wisdom, and we have faith in your ability and integrity to put these matters straight wherever you have an opportunity, thus securing millions of dollars to your country by the preservation of our livestock.

The veterinarian should also be protected in his vocation. Let the State boards eliminate the frauds and the unqualified. No worse calamity can come to you, as individual practitioners or as a profession, than for dishonest and unqualified men to enter your ranks and discredit your work and degrade your profession. I am glad that entrance requirements to veterinary colleges have been raised and that a good fundamental education must precede the veterinary course, and the course has been lengthened to full four years.

Laws should also cover the inspection of these colleges to determine the excellence of work done. It is a deplorable fact that institutions are turning out graduates that are absolutely lacking in knowledge and experience needed for practice.

Laws should be so rigid that veterinarians who are not qualified could be eliminated when proof could be found that they had evaded the law or disobeyed the spirit of the law. State boards should have the power to revoke licenses. It is up to the veterinarian who has spent his time and money to qualify himself to put out of business the charlatan and quack or their near relatives.

We believe the most needed law at present is one creating the county veterinarians all over this country. The county veterinarian is a coming factor in good, sanitary farm conditions. His services are sought upon a hundred problems and practices. The farmer is being educated to the idea of skill and care for his animals. He wants help and instruction about hog cholera, tuberculosis and all contagious and infectious diseases of livestock. The county veterinarian, working in coöperation with the local veterinarian, is a big asset to the farmers, and the idea works out splendidly wherever tried. The State Department can not reach its helpful offices to the great numbers needing and asking for assistance without some such agency. The laws should provide for the payment

of part of this expense by the county, the work remaining at all times under the supervision of the State Department. The State should vest the county veterinarian with complete police power, he, of course, being amenable to the State Department laws and regulations.

The effective means used to enforce laws should be vigorous campaigns of education, stiff penalties for disobedience, and hearty coöperation between veterinarians, farmers and sanitary bureaus. The educational work must come through the writings, speeches and work of all concerned in this great industry. Each man must be a missionary with his heaven. Laws will be enacted as their desirability and necessity become apparent.

These laws must have force in them in the matter of severe penalties for violation, as respect for laws does not always compel obedience. But the strong, all-important factor in this work lies in cheerful, helpful coöperation between all factions interested.

In closing, let me add that it is my belief that every growing city in the United States should employ one or more qualified veterinarians to look after its sanitary conditions. These veterinarians should be so trained that improved conditions would be noticeable and that the air which we breathe and the food which we eat would not be contaminated as it is in many of our cities at the present time.

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### KENTUCKY'S NEW STATE VETERINARIAN

At a meeting of the Kentucky Live Stock Sanitary Board, held at Frankfort, Ky., on December 16, Dr. W. H. Simmons was elected to the office of State Veterinarian, to succeed Dr. S. F. Musselman, deceased.

Dr. Simmons is a graduate of the Ontario Veterinary College, class of 1892, since which time he has lived in Kentucky, engaged in various phases of veterinary work. For twenty-two years he was an active practitioner; for two years he served as a Meat Inspector in the State Pure Food Department, and a like period in introducing and demonstrating the use of serum and virus in the vaccination of hogs against hog cholera; for the past two years he has been connected with the Department of Veterinary Science of the University of Kentucky as Extension Specialist in Veterinary Science.

During the outbreak of foot and mouth disease in Kentucky in 1914 and 1915 he was employed by the B. A. I. in assisting in diagnosing and eradicating the disease in that State.

## DOLLARS VERSUS HEALTH<sup>1</sup>

By WILLIAM THOMPSON

*Dominion Veterinary Inspector, Keremeos, British Columbia*

IT affords me much pleasure to have the honor of addressing one of the most important, useful scientific organizations in the world. I desire to address you on the necessity for resolving some policy to educate public opinion on the importance of adopting some adequate system of inspection, by properly qualified veterinarians, of all meats for home consumption, before and after slaughter. I hope you will not be bored by my reiteration of certain facts and the unavoidable repetition of arguments that have already gone to establish the principle on which similar papers of mine were formerly written. If I appear to some to be far too aggressive, surely in the force of my remarks will be found sufficient extenuation when the justness and urgency of the cause are properly considered.

In the past, State and Provincial veterinary associations have had the bitter experience of seeing their legislatures repeatedly shelve meat-inspection bills. The British Columbia meat-inspection bill has been shelved in two successive sessions of the Provincial Parliament. I am now, I hope, permitted to plead for public education in this respect, before the highest veterinary sanitary tribunal in North America, before the very bar of veterinary hygiene, where the chief witnesses for the prosecution are the thousands of cattle, sheep and hogs annually slaughtered anywhere and at any time without the vestige of supervision or veterinary inspection. Let this international council deliver judgment in the form of resolutions that will be heard and acted on by those holding the health of their peoples as being only second in importance to financial interests.

To my plea and the facts: My arraignment is against all those in high State and Provincial authority who, after being warned of the danger of uninspected meats, have turned a deaf ear to the pitiable cries of the 120,000 consumptives that die annually on this North American Continent, to say nothing of the millions of fresh cases every year. In order to prove my case I must necessarily quote some circumstantial evidence.

The report of the sub-committee of the conference of the Allied Red Cross Societies under the presidency of Sir Robert Philip states: "The center and pivot for the control of tuberculosis is the dispen-

<sup>1</sup> Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

sary." Now, had a properly qualified veterinary surgeon served on that honorable committee, in all probability he would have added: "The center and root of prevention of tuberculosis is the slaughter-house whence all infected herds could be located."

It is most regrettable that the many societies working toward the eradication of tuberculosis in mankind know so little about the invaluable services that could be rendered by qualified veterinarians in this respect. It is a regrettable fact that on those anti-tuberculosis committees, headed by medical doctors, also State and Provincial health boards, veterinary surgeons are notoriously conspicuous by their absence. That medical men and veterinarians do not work more together toward prevention of tuberculosis in the people seems unfortunate for the latter. It is a fatal waste of effort. Medical doctors can not be impeached for what they do not know. Sometimes they are milk inspectors, but if they can not follow the milk up to the dairy, it should be left in the hands of competent veterinarians, because medical men are by their education unfitted to pass an opinion on the animals that produce the milk. They are daily prescribing for their patients meat which has been cut from diseased carcasses, and they are incapable of knowing it in the absence of properly qualified veterinary inspection.

After many years of observation I am disappointed with the increase of tuberculosis. There is something lacking, and it is likely to continue so until the day of proper recognition for veterinary services dawns in the minds of the people. Then they will know the truth, which is that it is hopeless to expect to prevent this widespread disease by medical doctors, however eminent, without the cooperation of veterinary scientists. Until then the dispensaries will continue to function out alleviation to the already afflicted, and the ever increasing fresh cases coming on, no doubt; but the main roots of this disease will continue to grow luxuriantly from the private slaughterhouses.

It is greatly to be deplored, after all the discoveries of veterinary scientists, that those noble-minded anti-tuberculosis bodies fail to appreciate this fact. It is ignorance, not prejudice. What greater proof is there than this of the necessity for educating public opinion (which has been the judge in all ages) to the value of veterinary services. It therefore would reflect great credit on this Association were it to take steps toward this end. I ask you to recommend a declaration of war against this ignorance, load your guns and shoot straight with leaflets and printed matter of any kind, providing you

hit the mark; use the film and lecture hall to denounce it, and eventually veterinary hygiene will be accorded, for the purpose of preventing spread of disease from animals to mankind, an equal place in public opinion with that of medical hygiene.

From the earliest times the forces of enlightenment and progress have combated ignorance, which is the greatest hereditary enemy of mankind and the worst menace to civilization. No nation is immune from its evil influence. It has sent millions of humanity to early graves, and raised the worst men of every civilization to power.

Ignorance, with comparatively few exceptions, is abroad in the masses of this Continent regarding the dangers of uninspected animal products utilized for human food. It is the duty of every government to combat ignorance in the people, which in this case is hygienic.

The fault of uninspected meat and the invariable insanitary conditions surrounding those barbaric premises of private slaughterhouses, where the greater bulk of our meat is prepared for market, can not in every case be laid at the door of the authorities; it is just as consistently the fault of the people who through ignorance continue to tolerate it. I am of opinion that 90 per cent of people never saw the inside of a private slaughterhouse. One reason is because such premises are generally located in remote or secluded places, where the public seldom visit. Most of these places are heaped up with the bony *débris* of years; piles of skulls, some white with exposure, others still green with adherent diseased tissues; and in wet weather pigs wallow through muddy defiles of bones and offal, fighting and squealing for the newly thrown entrails of the slaughtered animals, covered with soil, slime and manure; the whole generally presenting a spectacle of abomination and filth beyond description.

In my opinion pigs are being infected as frequently by uncooked offal as from unpasteurized creamery products. Then pigs are slaughtered, smoked and cured, to be ingested by human beings, 95 per cent of whom are totally ignorant of the conditions under which such meat is grown.

I estimate that on this Continent during the war approximately 600,000 people died of tuberculosis. During that dark period we were accustomed to listen with bated breath to the daily casualty list, which brought home to us some realization of the military struggle. Were we to receive similar daily reports of the white plague cas-



ualties, the people would be aroused out of their accustomed lethargy to a state of hygienic consciousness and a fear for their physical safety.

The Canadian Medical Health Association met in Ontario this year, and like the majority of such meetings all over the Continent, no mention is ever made of employing qualified veterinary surgeons on their respective staffs. To continue to ignore to the people the value of veterinary services in stamping out tuberculosis in mankind is gross medical presumption, and the right to arrogate their opinion to the ruling authorities, preferably in the absence of veterinary scientists. Therefore it is not surprising when State and Provincial law-makers refuse to enact meat-inspection bills.

Lloyd George said: "We could have put into the fighting ranks—if the health of the people had been properly looked after—one million more men." I reckon that on the North American Continent only one-third its adult male population is fit for the hardships of the battle-field. And so long as the public health is entrusted solely and absolutely in the hands of the medical men, who are by reason of their education unfitted to opine on the food products of the cow, the sheep and the pig, their absolute ignorance on the food they prescribe, in the absence of veterinary inspection and the absence of veterinary scientists on those national health boards, so long will the health of the people on this Continent be improperly looked after. If the Governor of each State or Province would convene those national health boards, he would see that the health of the people was being properly looked after by inviting the veterinary fraternity as well as the medical to attend.

President Wilson is reputed to have once said that nothing should be allowed to stand in the way of preventing the spread of tuberculosis, and asked in the name of God why it was not done. I have good reason to say that question was never answered, but I purpose answering it here, before this honorable body: The medical fraternity in the very exclusion of veterinary scientists from their health boards disclose either their ignorance or aversion to the truth.

I believe, in the report of the dispensary work, that fresh air and light, regularity and plenty of good food, generally restore tuberculous children to a manifestly healthy state; but I also believe that prevention in the first place, in the supply of healthy meat, milk, eggs, butter, cheese, dripping, lard and fish after passing veterinary inspection, is the key note of a far better policy, which

would furnish some real and practical results in eradicating this disease.

If there be a real desire to eradicate this disease from mankind, on this Continent, the campaign should be directed from government health departments, whose heads should be capable of appreciating the fact that medical veterinary scientists must coöperate in order to combat successfully this great scourge.

I have always noticed that the greatest number of tuberculous children come of the poorer classes, whose bread-winner is economically forced to purchase the cheapest meat on the market, which means the old tuberculous cows and pork from tuberculous pigs. I have observed that the poorer children are devitalized, not so much for the want of fresh air as for a sufficient supply of guaranteed pure food, containing sufficient essential vitamins. The anti-tuberculosis policy of separating children from tuberculous parents until they are three years of age, without due regard to the purity of the food they eat, is too credulous a policy to expect full results in the matter of prevention.

I believe the idea that human tuberculosis originated from the bovine and porcine types to be basically correct, and all attempts to eradicate it from mankind without a due regard for this origin are fundamentally wrong. After many years of close observation, I believe that this transmission is going on all the time, more or less. So long as we are meat-eating nations we can not get rid of the plague in our kind until it is stamped out of the animals that supply us with about 37 per cent of our food.

Many believe and others teach that meat is harmless when properly cooked. But if this could be admitted by the veterinary or medical profession, it may kill the live germs, but does not purify the meat. Again, certain well-intentioned authorities order all milk to be pasteurized, which *may* render it harmless, but does not purge the tubercle bacilli from the flesh of the cow which produced it, so that tuberculosis is obtainable in the end in the absence of meat inspection. It is far more likely that those consumptives that lose ground after they return from the sanatoria have done so in consequence of ingesting degenerate animal foods.

If the billions of cells that in the aggregate make up a living animal—each cell containing millions of units, each with its separate electron—are of a degenerate order, their growth having been supplied from degenerate lymph cells, it is easily conceivable how tuberculosis supplants lymphatic and adjacent tissues. Therefore, it is

logically essential to growing tissues that the food we eat be cellularly pure and of a high generate order of vitamins; otherwise the feebly resistant cell walls of lymphatic tissues soon break down before the steady blows of the tubercle bacillus.

It is therefore perfectly clear that children should receive food containing not only sufficient vitamins and free not only of active tubercle bacilli, but absolutely free of the taint of susceptibility. It is just as important as the invasion of the tubercle bacillus that the mass of cells or food units that go to build up the tissues of growing children inherit resistance. Therefore, cooked or uncooked, I maintain that uninspected meat is a continual source of danger, and the too frequent reference to the purifying process of cooking is born of a fallacy on one hand and the desire to escape the financial consequence of inspection on the other.

The destruction of the seven hundred milch cows for tuberculosis by the Health of Animals Branch of Canada since its adoption of the policy of aiding cities desirous of assistance in this respect had in my opinion a more far-reaching effect in preventing tuberculosis in the children of Canada than all the efforts of the anti-tuberculosis societies in the country. Just fancy seven hundred potential centers of spreading this infection indefinitely snuffed out and this danger zone purified and made safe for those children. This achievement alone is worthy of a monument as high as the Eiffel Tower; yet I was miserably disappointed to read in the Annual Report of the Canadian Association for the Prevention of Tuberculosis only a passing commonplace comment.

Those seven hundred diseased milch cows are a standing rebuke to those persons, medical or laymen, who imagine they can prevent consumption in the children of the Nation without the coöperation of qualified veterinary surgeons. When it is considered that in the present state of medical knowledge there is no medicinal cure, only the assimilation of sufficient pure food being efficacious, it is manifestly apparent to anyone that a clean-cut, comprehensive policy of prevention from the slaughterhouse up to the dispensary is the most reasonable and wisest course to follow.

Again, it is advanced by invertebrate politicians and evasive tradespeople that uninspected meat never kills anyone. It kills insidiously, which they do not understand. There are, however, many deaths annually from uninspected meat, where the victim dies quickly. I have no time here to enumerate them, just one instance: Last year, June 7, at Dawson City, a coroner's jury declared a verdict of death from meat poisoning in twelve men as a result of

eating uninspected meat. Besides this form of poisoning, which is common, there are other diseases obtainable from uninspected meat of which you are well aware.

As soon as the public mind is educated to the danger of uninspected meats, the consumers, with the farming class, will see to it that their departments of agriculture are headed by the most eminent veterinary surgeon in their respective States. These men will possess the necessary outlook and the powers to advise the various State or Provincial boards of health. They could render them official veterinary advice and provide trained veterinarians so that an all-round comprehensive policy of prevention could be inaugurated.

In the meantime, until monetary grants are made by State and Provincial governments to educate public opinion no valid excuse can be advanced by them for delaying or refusing to enact a bill for inspection of all meat for home consumption.

And until adequate measures are adopted to induce large numbers of qualified veterinarians to enter the sanitary service of their country, medical doctors will continue to be handicapped in controlling the most widespread death-dealing plague of all times and 94 per cent of children will continue to become infected in the danger zone where there is no veterinary inspection and people on this North American Continent will continue to fill early graves at the rate of about 120,000 annually.

Gentlemen, in resolving on this important matter, you have a verdict to declare, a record to make, and in doing so you have an unprecedented opportunity to bring the veterinary profession more prominently before the public, and to convince the various State and Provincial governments of the wisdom and necessity of making money grants for educational purposes of this kind.

I therefore hope you will resolve upon and place yourselves on record as (firstly) favoring and strongly recommending State and Provincial governments to make monetary grants for educational purposes, embracing meat and milk inspection by accredited veterinarians; (secondly) to recommend that the private slaughter-houses as they stand be abolished as potential centers of infection, and impediments to a proper rectification of these places be swept away; (thirdly) recommend veterinary inspection of all meats for home consumption, under the most suitable system available and under State or Provincial control.

When these recommendations have assumed practical shape and veterinarians sit down with medical men in the councils of national health, then indeed will a new epoch in veterinary history be reached, and the honor and credit shall be eternally yours.



Private Uninspected Slaughterhouse and Yard



## THE NEBRASKA HEMORRHAGIC SEPTICEMIA EXPERIMENTS AND THE CRITICS

By L. VAN ES and H. M. MARTIN

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THE publication of certain results of experiments with commercial vaccines and bacterins against hemorrhagic septicemia and fowl cholera by Van Es and Martin (31, 32) has induced a number of employees of bacterin manufacturers to assail this work, showing even a little tinge of ill temper. On the reviewer's page of veterinary journals, in quasi-veterinary journals and in beautifully decorated advertisements they have undertaken to prove that the conclusions arrived at by Van Es and Martin are all wrong, maliciously concocted, and that the scientific foundation for the use of hemorrhagic septicemia vaccines and bacterins cannot be questioned. Pasteur, Kitt, Lignières, and even the inevitable buffaloes of the Yellowstone National Park, are marshalled upon the stage to impress the reader with the strength of the hemorrhagic septicemia vaccine and bacterin cause.

All this is extremely interesting, both on account of what is said and above all because of what is not said and kept in the dark. In view of the latter especially, it may be useful to engage the readers' attention to what may be called a brief review of reviews.

Most of the critics (3, 22, 29) indicate or assert that Van Es and Martin practically murdered their immune animals by means of overpowering doses of virus. They find fault because nothing was said about the minimum lethal dose. As a matter of fact Van Es and Martin were not concerned with minimum doses as long as it is a well-known fact that really immune animals withstand doses of *Bacillus bipolaris* of enormous virulence which are much in excess of those which were actually used by them. Hadley (8), who is actually quoted and highly indorsed by critic King (22), describes that his immunized rabbits survived doses of 1/100 c.c., 1/10 c.c., and even 2 c.c. of bouillon culture of his strain No. 48, of which he states that from one to four organisms will kill the controls. In another publication by Hadley (6), which, by the way, conveniently escaped review by the critic King (22), this author states in his summary: "Resistance in rabbits to ten billion times the minimum

lethal dose of a very virulent culture has been artificially produced by a single large dose (3 c.c.) of the homologous culture."

Mack and Records (24), whose work is also approved and highly commended by the same critic, in a series of experiments did not consider it wrong to use test doses of from 1 to 4 c.c., while in other series the dose of 1 c.c. was given. Pasteur (27, 28) does not even mention minimum doses, while Kitt rarely refers to doses at all, and when he does he mentions  $\frac{1}{2}$  c.c. of a gelatin culture (16) or one drop of virulent blood (19).

It is strange that with those facts, mostly quoted from authors who apparently enjoy the confidence of King (22) and whose writings he actually pretends to review, so much fault should be found with the doses used by Van Es and Martin, who, in nearly all their series, used one loopful, even if the dose is not always shown in their data, and who only once used  $\frac{1}{10}$  c.c., and on several occasions used  $\frac{1}{10}$ ,  $\frac{1}{4}$  and  $\frac{1}{50}$  of a loopful. When King (22) encountered those latter smaller doses he deemed it wise to withhold the facts from his readers.

In order to permit a comparison of the doses used by Hadley with those used by Van Es and Martin, the latter quite lately had an experienced analyst weigh a number of their loopfuls. This showed that a loopful contains a little less than 5 milligrams of a bouillon culture, so that the smallest dose quoted from Hadley was still twice that ordinarily used by Van Es and Martin.

In addition, the cultures used by the Nebraska workers do not compare in virulence with the No. 48 of Hadley. The virulence of *B. bipolaris* ranges from that claimed by Hadley for his No. 48 strain to perfect avirulence. How King, Eichhorn and the other critics, complaining that Van Es and Martin failed to inform them on the subject of virulence, can claim that the presumably immune rabbits and chickens were killed by overwhelming doses is more than we know. If not informed, how could they know that those doses were overwhelming?

The reference made by some of the critics to the testing and use of antiphtheritic and antitetanic serum has no bearing on this case. We scarcely need to point out that toxin and antitoxin unite in definite proportions and the former will always kill when in excess. In antibacterial immunity the modus operandi is entirely different.

However, all this smoke and fume about minimum doses has created in the present writers a little curiosity as to how commercial

bacterins would actually perform if, for instance, the minimum lethal doses were used in the final test of the vaccinated or bacterinated animals. The following experiment may thus be of interest to our critics as well as to more disinterested readers.

As a preliminary to the vaccine-bacterin test proper the following tests were made in order to determine so far as possible the smallest virus dose which promptly kills the subjects inoculated. We selected a virus strain No. 620, a *B. bipolaris* isolated on a former occasion from a vaccine which was virulent to a number of test animals. This strain had never shown an unusually marked degree of virulence. Table 1 shows the details of this preliminary experiment:

TABLE 1

RABBIT No.	INTRAVENOUS VIRUS INJECTIONS OCT. 22, 1920 (24-HOUR BOUILLON CULTURE)	DATE OF DEATH	REMARKS
894	0.001 c.c.	.....	Lives
895	0.001 c.c.	Oct. 26, 1920	No organisms found by microscopic examination.
896	0.002 c.c.	Oct. 24, 1920	
897	0.002 c.c.	Oct. 24, 1920	
898	0.010 c.c.	Oct. 23, 1920	
901	0.010 c.c.	Oct. 23, 1920	

The table indicates that if the virus dose of 0.002 c.c. were used in testing the immunity of the treated rabbits, we would be gratifying as nearly as possible the demands by our critics that their products be tested against something like a minimum lethal dose. At least the charge of killing immune rabbits by overpowering doses with malice aforethought would not be valid in this case.

The bacterins and vaccines tested were as follows: Vaccine sample No. 620 (bovine), commercial origin, again tested against the organism from which it was made (autogenous vaccine).

Bacterin sample No. 717 (bovine), of commercial origin.

The expiration date of sample No. 620 was given as February 1, 1921, and that of sample No. 717 was given as September 23, 1921. The vaccine doses used were those recommended on the labels.

Table 2 shows the details of the immunity test.

TABLE 2

RABBIT No.	VACCINE OR BACTERIN USED, No.	DOSE OF SAME, c.c.	INJECTION DATES (1920)			VIRUS IN- JECTIONS, 0.002 c.c. <i>B. bipolaris</i> No. 620, Oct. 25	DATES OF DEATH	REMARKS
			SEPT. 30	OCT. 5	OCT. 11			
862	620	2	x	x	x	x	Oct. 27	
863	620	2	x	x	x	x	Oct. 26	
864	620	2	x	x	x	x	Oct. 28	
865	620	2	x	x	x	x	Oct. 26	
866	717	5	x	x	x	x	Nov. 4	
867	717	5	x	x	x	x	Oct. 26	
868	717	5	x	x	x	x	Oct. 28	
869	717	5	x	x	x	x	Oct. 26	
870	717	5	x	x	x	x	Oct. 28	
871	717	5	x	x	x	x	Oct. 27	
878	.....	.....	.....	.....	.....	x	Oct. 28	Control
879	.....	.....	.....	.....	.....	x	Oct. 26	Control
880	.....	.....	.....	.....	.....	x	Oct. 26	Control
881	.....	.....	.....	.....	.....	x	Oct. 27	Control
882	.....	.....	.....	.....	.....	x	Oct. 26	Control
883	.....	.....	.....	.....	.....	x	Oct. 26	Control

From these results it is apparent that the results obtained and recorded in Nebraska Bulletin 17 by Van Es and Martin (31) were again repeated and absolutely confirmed when the tests were made in accordance with the expressed or insinuated wishes of bacterin-producing critics.

Another fault committed by Van Es and Martin which in the eyes of their critics can not be sufficiently condemned is the entire omission of references to the work of other authors. In the publications mentioned Van Es and Martin do not deal with the question of immunity against hemorrhagic septicemia in general and were not concerned with the results of those who experimented in an effort to throw light on its possibility or on the means by which it could be made useful if it should exist, for so far as they know now there is no literature which shows that any disinterested worker had ever subjected the commercial vaccines and bacterins to any experimental inquiry. Van Es and Martin undertook to find an answer to the question, Are the hemorrhagic septicemia bacterins and vaccines of commerce good, bad or indifferent? and found nothing in literature indicating that such inquiry had ever been made by anyone. The literature which the critics urge should have been consulted throws absolutely no light on this question, as all the workers mentioned used materials prepared by themselves. Why, then, should

Van Es and Martin have padded their publications with irrelevant and immaterial evidence?

The critics mentioned (3, 22, 29) make pretention in their reviews to supply what they would have the reader believe to be a flagrant deficiency of the articles by Van Es and Martin. As will be shown later in this paper, they quoted conclusions without the same challenging of evidence as displayed in dealing with the Nebraska bulletins, withheld much that may be interpreted as unfavorable to the bacterin cause, and even went so far as actually to misquote or falsify the statements made by writers referred to.

We will presently return to the evidence contained in the literature, as we are willing that our critics shall have their appetite for quotations and reviews appeased to the extent of our ability at least. Before doing so it may be well to examine some of the further criticisms offered by the reviewers individually. For instance, Eichhorn (3) ventures the opinion that if the work of Van Es and Martin were carried out with any human or veterinary biologic products, we would hardly have today a single biological product which would be considered dependable for the prevention or cure of disease.

While we are loath to permit ourselves to be drawn away from the concrete case in hand, it may be well to recognize the fact that the number of useful immunizing agents is indeed quite small and that the value of these has always been proven by well-controlled laboratory experiments or field trials before they became articles of commerce. On the other hand, there is some probability that there are indeed great numbers of others which would prove to be as worthless as the anti-hemorrhagic septicemia products of commerce if they were subjected to the kind of tests which Eichhorn seems to condemn. We are sure that if such a thing came about nothing worth while would be injured in particular.

The review by the critic King (22) may also be examined more closely, as it is a fair sample of the tendentious nature of his efforts. At first sight the heading of his article conveys the impression that the following publications were reviewed, viz: Nebraska Bulletins 17 and 18 by Van Es and Martin, Rhode Island Bulletins 144, 146, 150, 157, 159, and 179 by Hadley, and Nevada Bulletin 85 by Mack and Records. A closer examination of the text, on the other hand, reveals the fact that this is not the case, and that this critic is indeed in more than one way a reviewer of titles. Nowhere does this partial reviewer analyze Rhode Island Bulletins 144, 146,



150, 157, and 159, so that of the nine publications which are displayed only four come in for discussion. The lion's share is measured out to Nebraska Bulletins 17 and 18, although, as in some of the others, the reviewer finds it convenient here and there to suspend his critical observations and leave things entirely without either his approval or his disapproval. For instance, quoting the conclusions of Bulletin 17, he omits what may perhaps be regarded as a very essential part of those, the sentence: "We encountered uniform negative results no matter if we injected those substances once or a dozen times."

Van Es and Martin are taken to task for having followed the lines of destructive methods, for having manifested a distinct "prejudice," "discrediting the work of experiment stations, rather than that of the biological laboratories." How this critic arrives at those conclusions we can not know. We believe to have laid the cards fairly on the table in the publications mentioned. The immunizing value of commercial vaccines and bacterins was tested, and no essential detail of those tests was withheld. That the results and conclusions were highly disagreeable to this reviewer seems plain enough, but in the face of the evidence where is the prejudice? One moved by prejudice might perhaps find far more vulnerable ventures among the so called "biologics" of commerce upon which to wreak vengeance. The Nebraska bulletin may for a time have destroyed the sweetness of this reviewer's temper, but we believe that nothing more valuable was injured in the process.

Continuing his critical offensive, King (22) further charges that in Experiments V, VI, VII, VIII and XI second injections of virus were given to surviving animals after the controls had died, for the evident purpose of not letting a bacterin-treated animal get by. We fear that the critic King (22) is taking some liberties with the truth in two of the instances he mentions and that he severely bends it his way in the others. The truth is that Tables V and VI show most clearly that no second injections were made. Table VII shows that a second injection was made because the first virus injection failed to kill the controls, although it killed a number of the presumably immune rabbits. As the data of Table VII are presented for discussion, we may point to them as a commentary to the charge of "overwhelming doses" of very virulent material as well as the high (?) degree of immunity engendered by the bacterins used. We gladly admit that in Table VIII the record is found to show that a single surviving animal received a second virus injection three

days after the first one. It is a case of a rabbit bacterin-treated not less than eight times. Its two mates as well as the two controls died promptly, but when three days later the survivor was injected with a different strain of culture, it died likewise. We are, however, not certain which of the two injections actually killed this animal.

In Table XI another single rabbit is shown to have been injected a second time. As this animal was injected with 1 c.c., 1 c.c. and 10 c.c. of vaccine, a high degree of immunity was expected when it failed to succumb. After two days a second injection was given, and it died four days later, with the greatest probability that the first virus dose was as much responsible as the second one for its death. It is also interesting to observe that in this series the virus was isolated from the very vaccine which was used to immunize the animals.

Then speaking of the fowl-cholera series the critic says further: "In three out of six of these experiments in which one overwhelming injection of virus did not kill, although all controls were dead, a second injection was given from four to six weeks later for the apparent purpose of fatally terminating all survivors." It looks as if the critic is straining himself to make a mountain out of a mole-hill to the extent of practicing deception.

Here are the facts. Of the chickens referred to in the series mentioned there were altogether left nine, of which eight were chronically sick on account of the first virus injection. Only one had not become sick, and its immunity was challenged by a second virus injection, and at the same time the sick ones were also given a virus dose. It was not immune. These results in no way affect those of the experiments, as the sick chickens were already checked off as not immune. This is what the critic King (22) describes as "manipulation of experimental results." It is not by any means, but if the critic desires to score the two rabbits and the one chicken as proof of the immunizing value of the bacterins and vaccines, the present writers have no objection.

Another critic (29) brings Hutyra and Marek upon the scene and says:

"According to Hutyra and Marek, page 86, Vol. 1, test animals inoculated with a (hemorrhagic septicemia) vaccine will show a resistance against a virulent infection, while control animals will die or become severely affected, with the exception of very virulent intravenous infections. \* \* \* In connection with the above, the same author further states that in the use of this vaccine in the field, when

used in the slower forms of the disease which are frequently associated with other organisms, the results were less favorable than in the acute septicemic form, but even in these cases the mortality was conceded to be reduced from 50 to 12 per cent."

We have before us the English translation of Hutyra and Marek, second American edition of 1916, and the third German edition of 1910. On neither of the pages 86 do we find the statements mentioned, but we find something like it on page 93 of the American edition and on page 87 of the German edition.

According to the critic mentioned, the words quoted by him must be taken as Hutyra and Marek's own opinion and as their indorsement of bacterins and vaccines. A closer inspection of what is said in the editions at our disposal reveals something entirely different. In the first place, the words used by Hutyra and Marek relate merely to work published by Lignières (23) and the claims made by the latter. In the second place, our critic either commits a mistake or a falsehood by using the words "but even in these cases the mortality was *conceded to be reduced* from 50 to 12 per cent," where the originals read: "Although even in these cases the mortality has been *supposedly reduced* from 50 to 12 per cent."

For the sake of a better appreciation of what Hutyra and Marek actually do say, as rendered in the second American edition, we quote as follows:

"Lignières therefore prepared a so-called polyvalent vaccine, which is potent against all the diseases of this group. The vaccine is prepared from mixed cultures of the hemorrhagic septicemia bacteria of sheep, cattle, dogs, horses, hogs and chickens and attenuated at a temperature of 42°-43° C." (What next follows is in small print.)

"The vaccine prepared from the six varieties of virus is *supposed\** to immunize against all of the six diseases. Test animals inoculated with this vaccine will show a resistance against a virulent infection, while control animals will die or become severely affected (with the exception of very virulent intravenous infections). In practice the vaccinations are *supposed\** to have given good results, especially against the acute septicemic forms of hemorrhagic septicemia, as, for instance, against chicken cholera and hemorrhagic septicemia of sheep. On the other hand, the results in the slower forms which are frequently associated with mixed infections were less favorable, although even in these cases the mortality has been *supposedly\** reduced from 50 to 12 per cent.

"The immunization consists in a subcutaneous or intraperitoneal injection of the vaccine; the second inoculation follows in from twelve to fifteen days. In infected localities, it is advisable to under-

\* The italics are our own.—Van Es and Martin.

take the vaccination on sucking animals eight to ten days after their birth or at least shortly before weaning. The immunity produced by the vaccination lasts for about a year and therefore it is advisable in infected localities to repeat it annually."

Let us point out in passing that even if Lignières's method were a great success, it differs quite materially from the vaccines and bacterins tested and mentioned in Nebraska Bulletins 17 and 18. Furthermore, there is nothing in the remarks of Hutyra and Marek which indicate that they think at all favorably of Lignières's work. No doubt it was necessary and proper to mention this work in a textbook, but as we read the reference there is between the lines something which looks like skepticism, delicately and politely permitted to come to the surface. We found nothing in Hutyra and Marek's work which by any stretch of the imagination can be interpreted as an indorsement of bacterins and vaccines against hemorrhagic septicemia.

As stated above, our critics have nearly all condemned the work published in the Nebraska bulletins because no reference was made to investigations published by prior writers. We hope to have made it plain why this was not thought to be necessary, but in view of their clamor for bibliographic quotations, and as a mark of our desire to comply to what the critics deem to be a reasonable demand, we will ask the reader to accompany us on a little journey through literature so far as it pertains to the authors quoted by the critics themselves and to those who are commonly mentioned in less critical documents, remarks at veterinary meetings, etc.

No author has been more often quoted in connection with the hemorrhagic septicemia of fowls than Pasteur (27, 28). It is, however, a well-known fact that the method of vaccination proposed by the master failed either in the hands of other investigators or when used in outbreaks. Kitt (14), while rendering tribute to the genius of Pasteur, describes his fowl-cholera vaccine as "highly superfluous," "dangerous," and "absolutely without practical value." The work of Pasteur is of extreme importance because it showed for the first time that pathogenic germs could be attenuated and that they might in that condition become useful as immunizing agents. As a practical solution of the fowl-cholera problem it accomplished little or nothing.

Along with the name of Pasteur the one of Kitt (14, 15, 16, 17, 18, 19, 20, 21) is commonly named when the use of hemorrhagic septicemia bacterins and vaccines is to be justified or their sale to be promoted. No investigator has made more persistent and conscien-



tious effort to bring about a practical method of controlling the various forms of hemorrhagic septicemia than this meritorious worker. From every possible angle he attacked the problem, by the use of Pasteur vaccines, killed or attenuated cultures, the egg white of immune fowls and serum. In many instances did he secure immune animals, but his writings show nowhere that the results of his labors had developed beyond the laboratory stage or that this scientist showed any inclination to be responsible for the introduction of any method into the field. Only in one publication (21) does he make the faintest suggestion that experimental results might be put to some practical use, and in this instance his remark pertains to serum and not to vaccines and bacterins.

Lignières (23) has already been mentioned in the reference relating to Hutyra and Marek's statements, and it was there suggested that as this method of vaccination consists of two vaccines of different degrees of attenuation it has nothing in common with the vaccines and bacterins on our own market. Furthermore, Lignières in his report (23) distinctly states that in the attenuation of his cultures the action of heat, oxygen or antiseptics gave only mediocre results.

In one of the publications of Hadley (6) he relates that his results indicate that a highly virulent culture of fowl cholera encounters resistance in a susceptible animal when this animal has been previously inoculated with an avirulent homologous culture; resistance in rabbits to ten billion times the minimum lethal dose of a very virulent culture has been artificially produced by a single large dose (3 c.c.) of the homologous culture. None other than homologous cultures produced such resistance in rabbits. Apparently Hadley (6) had in his strain No. 52, which is either avirulent or but slightly virulent, an organism endowed with a marked immunizing power.

In a subsequent paper (7) Hadley publishes some further studies of fowl cholera immunity, making further use of his strain No. 52 as a vaccine. He found this immunity thus produced to be fairly lasting.

Among some of the results reported by Hadley we find the following:

"It may be tentatively concluded from the experiment that heating to 44° C. for three hours does not attenuate culture No. 48, while heating at 63° C. and thereby killing the culture leaves it with no ability to bring about resistance when only one or two injections are given. Three injections appear to exert a greater protective influence, although this point can not be conclusively stated at this



time. With reference to culture No. 52, it is shown that heating at 44° C. did not destroy the ability of the culture to exert its protective action, while the culture killed by heating to 63° C. failed not only to produce a local reaction, but also to protect against subsequent inoculations with culture No. 48 unless three injections were given, and this requires confirmation."

"The apparent difference observed in the case of rabbits inoculated several times with the killed cultures should be studied further, but the results seem to remove this type of immunity from that commonly produced in many specific diseases by the use of 'bacterins' or bacterial vaccines, produced from virulent cultures. Further tests of the value of killed cultures in producing resistance are needed before definite conclusions can be reached."

Apparently the work of Hadley contains but little warrant to undertake fowl-cholera immunity production by the bacterin route.

Hadley continued his highly interesting and important studies and communicates his results in a later publication (8). The task he sets himself in this series of experiments is efforts to ascertain, first, the protective power of certain avirulent cultures of the fowl-cholera organism against a highly virulent culture (No. 48); second, the extent and degree of protective power exercised by a certain immunizing culture (No. 52) against twelve heretofore untested virulent strains; third, the protective power of combinations of cultures.

Hadley (3) briefly describes his results as follows:

"Among seventeen strains of the actual fowl-cholera bacteria which have now been tested for their resistance producing power toward a highly virulent culture only one (No. 52) was found which produced any resistance whatever; and this culture upon subcutaneous inoculation invariably gave perfect immunity against the most virulent culture in the laboratory collection (No. 48).

"This immunizing culture has now been tested (alone) against five other virulent strains, toward three of which it is also protective. In the other two cases it is irregularly protective.

"In the two instances in which culture (No. 52) alone failed to protect or protected irregularly, complete protection was afforded by inoculation with culture No. 52 followed after one week or more by inoculation with culture No. 48.

"In all cases in which culture 52 alone was not tested against virulent cultures (seven) the inoculation with both cultures 52 and 48 in the sequence and under the conditions stated, yielded complete immunity.

"The results obtained in the investigation thus far reported are such as to afford for the first time complete control over infection in rabbits with probably any virulent strain of the fowl-cholera bacterium. The method thus found successful for the active immuni-

zation of rabbits will now be employed, perhaps with modifications, in an attempt to produce a corresponding active immunity in birds."

About five years later Hadley completes the work projected in the last paragraph and presents in a recent paper (9) "the results of a study of the effectiveness of killed cultures in the prevention of cholera of fowls, a disease whose progress among poultry has hitherto been checked by no successful practical method of serum or vaccine treatment."

In this last paragraph this author, who certainly can not be accused of lack of power for sound thinking or of inability to estimate correctly the value of scientific evidence, sums up the present-day status of immunizing methods in the control of avian hemorrhagic septicemia.

The discovery of an avirulent or slightly virulent strain (No. 52) of a remarkable immunizing value is followed up by the author by controlling his previous hopeful results with experiments in which fowls were also used. His final conclusions are stated in the following summary:

"The present paper presents the results of attempts to immunize rabbits and fowls against infection with a virulent strain of *B. avisepticus*, by means of injections of cultures killed by heating. The results show, first, that injections with cultures of an avirulent strain (52) produced more satisfactory results in rabbits and less satisfactory results in fowls than did treatment with cultures of the virulent strain (48); second, that in the case of rabbits, the individuals that received the maximum number of inoculations or the maximum dosage were best protected; third, that in the case of fowls, those individuals that received the protective inoculations subcutaneously were slightly better protected than those that received treatment by the intraperitoneal route; fourth, that even though the inoculations with killed cultures of the avirulent or virulent type may not invariably produce immunity, such protective inoculations may produce an increased resistance to infection which manifests itself by delaying the fatal termination."

No investigator followed up by well-ordered experiments a more hopeful indication than did Hadley with his immunizing strain (No. 52), yet in the final analysis he only succeeded in delaying the fatal termination of his subjects. No experimental results show more conclusively the extreme difficulty of securing anything like a constant and dependable immunity against hemorrhagic septicemia than Hadley's, and in no instance does this author give the faintest suggestion that there is the slightest evidence of promise by vaccines or bacterins for the practical control of the diseases under consideration.

Very similar results are reported by Gallagher (4), who concludes that "no noticeable resistance is conferred to fowls by the use of killed fowl-cholera bacilli as immunizing agents."

Whether or not the work and observations reported by Manninger (25) from Hungary are indications that something substantial has been achieved by the use of his avirulent cultures subsequent development only can tell.

Two of the critics (3, 22) quote at length such conclusions of Mack and Records (24) as appear suitable for their purpose. It may therefore be considered proper to invite the reader's attention to this work and so far as fowl-cholera immunity is concerned to examine in a more or less critical manner the evidence upon which the conclusions mentioned and approved by our two critics are based. It may further be instructive to refer briefly to at least one part of Mack and Record's publication which one critic (22) who professes to review this work entirely withheld from his readers. That part refers to the attempts of Mack and Records to immunize rabbits and fowls by means of the use of bacterins. For the details of those experiments we refer the reader to the original, which, no doubt, can yet be obtained from the experiment station concerned or which can be found on the shelves of many libraries.

As in the experiments of other authors, a number of animals survived the virus injections, yet in their final summary Mack and Records state that "the injection of from one to three doses of bacterin failed to produce immunity in chickens sufficiently to enable them to withstand subsequent inoculation with virulent cultures." Why the critic (22) does not review this part of the work of Mack and Records he does not reveal. The doses of virus used by those authors certainly offered a fine morsel to one who found so much fault with the ones used by Van Es and Martin (31, 32).

After the description of their laboratory experiments Mack and Records describe their field experiments, although it appears from the text that the latter preceded the more exact laboratory experiments. In fact, they somewhat rejoice because they did not begin their work with laboratory experiments, because this would perhaps have caused them to think that the field work would be useless. Let us see if this was not the case after all.

The particulars of the field trials may be examined in the original, where the final conclusions may also be seen as well as in the reviews by the critics of the Nebraska bulletins. When we analyze

the evidence as well as the conclusions, certain very salient features can not fail to engage our attention.

The minor one is a question of diagnosis. While in the beginning of the publication it is stated that in every instance the diagnosis was established by bacteriologic methods, the records of the field outbreaks sometimes show that there were exceptions. However, the present writers are willing to assume that in all the outbreaks the authors were actually confronted with fowl cholera and not with other causes of deaths.

A more serious, in reality a fatal, objection to the acceptance of the authors' conclusions is associated with the fact that not in a single instance were the results controlled by leaving a certain number of exposed fowls untreated. It certainly seems evident that without this dependable conclusions are utterly impossible.

It is true that occasionally a few birds escaped treatment, but apparently they were lost sight of or were included when further vaccinations were undertaken. Only in one instance (flock 15) were the untreated fowls at all considered, and as they practically all survived, the authors, while claiming success for the treatment, were forced to admit that owing to this fact the outbreak was nearly spent and only the naturally more resistant birds remained. In the preceding accounts of other outbreaks no attention was called to such a possibility, in spite of the fact that in a number, half or nearly half of the flock had succumbed at a time when immunization was attempted. This alone should render the use of untreated controls quite imperative, and to this must be added the further need of controls by the fact, somewhat emphasized by the authors, that Nevada strains of *Bacterium avisepticum* possessed a comparatively low degree of virulence for chickens in laboratory tests (page 28).

Owing to the fact thus that the conclusions of Mack and Records are based entirely on uncontrolled field observations, we are forced to reject them as evidence without reserve. The value of bacterins in field outbreaks so far as their work is concerned still remains an entirely open question.

The same objection can be offered to the conclusions of Hardenbergh and Boerner (10, 11, 12), in addition to the fact that in some of their work the question of an exact verification of diagnosis was left open. As those authors, however, worked with virulent cultures only, their results have no bearing on the value of bacterins and vaccines as discussed in this paper.

Another report published by Haring (13), recently quoted, we are

told, in support of hemorrhagic septicemia bacterins, as used in sheep, reveals no mention of control animals, while in this very publication we find the following sentence in regard to their value in fowl cholera in turkeys: "In turkeys the results of an investigation of the value of autogenous bacterins in control of the disease seem to indicate that the bacterins have neither curative nor immunizing value." We were assured by our informer that this was not quoted.

Among all the publications quoted as a warrant for the use and sale of hemorrhagic septicemia vaccines and bacterins, not a one has been held before the veterinary practitioner more often than the one by Mohler and Eichhorn (26) in connection with the buffaloes of the Yellowstone National Park. Again we invite the reader to examine the evidence in the case. Mohler and Eichhorn (26) relate in their paper that during the month of December, 1911, between the 3d and the 15th of that month, 22 buffaloes of the Yellowstone National Park died of a disease which from an examination of material sent to Washington they diagnosed as hemorrhagic septicemia. They deemed vaccination advisable and prepared two vaccines by using different degrees of attenuation of their organisms, the less attenuated or second vaccine to be injected some ten days after the first one. It must here be observed again that the vaccination practiced by them has nothing in common with the so-called immunizing agents such as were tested by Van Es and Martin (31, 32). The authors then caused the buffalo herd to be vaccinated, and report that "following the vaccination, the herd was carefully observed and no immediate effects were noticed from the vaccination and up to the present time [December, 1912—V. E. and M.] there has been no indication of the recurrence of the disease among the buffaloes."

All this seems to be sufficiently clear and complete to be urged to the attention of prospective buyers of their wares by bacterin and vaccine makers and salesmen. Yet when we examine the paper closer a desire for further information grows upon us. For instance, when did this vaccination take place? How many animals died between December 15 and the time of vaccination? Were any untreated controls left in order to check the value of the treatment? Those questions are pertinent if we are to interpret results obtained, but the authors omit this detail.

Fortunately the missing links in the chain of evidence may be found in the report of the Acting Superintendent of Yellowstone



National Park (30) for the corresponding period. This official states:

"A disease attacked the herd in December just after the buffalo were taken up from the range, where they had been day herding during the summer, and 22 died before it could be stopped. The Department of Agriculture sent a veterinarian to the Park to do what he could, and after examination of specimens from the dead animals sent to that Department in Washington the disease was pronounced to be hemorrhagic septicemia, although its symptoms were at first thought to be those of blackleg.

"In June a veterinarian was sent by the Department of Agriculture, who vaccinated all of the adults of the herd with serum prepared and furnished by this Department as a protective measure.

"In addition to the 22 animals that died of disease, 2 bulls and 4 cows have died or had to be killed for various causes during the year. These, however, were of but little loss to the herd, as they were old or decrepit animals and unfit to remain in the herd."

With this supplementary evidence in our possession we are in a position to know what actually happened or was done: In the space of about twelve days, 22 animals of a herd of about 160 buffaloes succumbed to a disease diagnosed as hemorrhagic septicemia. No more animals died of this disease. Not less than six months later the adults of the herd were vaccinated against this disease, so that in the younger animals, which are stated by Mohler and Eichhorn to be especially susceptible, we may have had the desired controls. For practically one year after the last death, so far as the evidence shows, no more losses occurred in any of the animals, young or old, vaccinated or not vaccinated.

Those, then, are the actual facts upon which veterinarians and livestock owners are asked to pin their faith in the immunizing value of bacterins and vaccines against hemorrhagic septicemia.

It must be said to the credit of the authors that in their original publications they offered no conclusions and said nothing to indicate that the work was offered in support of any vaccination method.

At a later period, however, one of them (Eichhorn, 1) remarks: "For the first group (hemorrhagic septicemia) a successful vaccine is being prepared by cultivation of the organism under attenuating influences. This method has been tried out on an outbreak of hemorrhagic septicemia among the buffaloes in Yellowstone National Park." On a later occasion during the same year Eichhorn (2), again speaking on the subject of hemorrhagic septicemia vaccine, says: "Unfortunately there is not sufficient data available to offer conclusive proof that the good results obtained were due to the

administration of vaccine." Perhaps those rather contradictory remarks were merely deemed to be expedient, but they are nevertheless interesting, inasmuch as they tend to show that some doubt existed within quite recent years in one who now so valorously breaks a lance in behalf of the products under consideration.

The good results reported by veterinarians from the field are often offered as conclusive evidence of the great value of commercial bacterins and vaccines. As long as we have no assurance of an unquestionable diagnosis, as long as there is no record of untreated controls, this evidence is irrelevant and immaterial. It only shows that the substances used do no harm to the animals treated.

If practitioners of veterinary medicine are convinced that certain lesions found at autopsy are unmistakable evidence of hemorrhagic septicemia, if they are satisfied that they can differentiate those from similar lesions produced by other causes, if they are willing to accept without question the bacteriologic diagnosis made for them by firms primarily concerned with the making and sale of bacterins and vaccines, and if they are persuaded by experience or otherwise that the use of the latter is the proper remedy, they are certainly within rights of which it would be indelicate and improper for any one to question the validity. When, on the other hand, their results are brought forward as proof conclusive of certain facts, there can be no legitimate objection to having the evidence challenged.

After a critical examination of the data presented we are forced to conclude that no field or laboratory experience has as yet been presented which in an incontrovertible manner shows the dependability of vaccines and bacterins against hemorrhagic septicemia, and that all which pertains to an active immunity against this disease has as yet not been advanced beyond the purely experimental stage. Those conclusions are amply confirmed by the results published in Nebraska Bulletins 17 and 18.

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### INTEREST IN IMPROVING PET STOCK

Applications to recognize the improved breeding of such stock as Belgian hares, wild ducks raised in captivity, game birds, and dogs is making it difficult for officials of the Bureau of Animal Industry to determine just where the dividing line between farm livestock and other animals, including pet stock, should be drawn in developing the "Better Sires—Better Stock" campaign. The classes in which particular efforts toward improvement by the use of purebred sires are being directed include cattle, horses, asses, swine, sheep, goats, and poultry.

A supplementary list of pet stock and miscellaneous animals is being kept, and thus far 176 such animals, all bred to purebred sires, have been listed. The predominance of interest, of course, is in the improvement of general farm livestock, of which nearly 400,000 head are now listed with the department.

## CLINICAL AND CASE REPORTS

### PORCINE METRITIS

By A. T. KINSLEY, *Kansas City, Mo.*

CASES of metritis have not been reported as commonly in the sow as in the cow. During the past season a condition has developed which is very similar in many respects to infectious abortion and there has been an associated metritis in a large percentage of those cases. From the intensity of the process and the associated lesions, it appears justifiable to pathologically classify porcine metritis as catarrhal, purulent and septic.

Catarrhal metritis may be acute or chronic. In some cases the lesions have been confined to the uterine mucosa and the condition would therefore be properly designated as endo-metritis. The different types of inflammation of the uterine structures in swine have not been clinically differentiated up to the present time.

Porcine metritis is usually a sequel of abortion or difficult parturition, although some cases have been observed in which parturition was apparently normal. No one specific microbial agent has been identified as the specific cause of abortion in swine. Pyogenic micrococci and streptococci, *Bacillus abortus* (Bang), representatives of the colon typhoid group are the principal microbial agents that have been isolated from the cases of metritis. *B. pyocyaneus*, *B. suispestifer* and *B. suissepticus* and some other microbial agents have been found in some cases, but were not considered to be an etiologic factor.

It is possible that the causative factor or factors that have produced such extensive abortion in sows recently, will be found to be the cause of metritis.

The principal lesions thus far observed in porcine metritis consists of congestion and tumefaction of external genitals, relaxation and dilatation of the uterine horns, the presence of variable quantities of fluid, the character of which will depend on the type of inflammation in the uterine cavity, and there are usually fragments of the placenta within the uterine horns. Catarrhal metritis is characterized by congestion and limited tumefaction of the uterine mucosa. The uterine cavity will contain a varying quantity of a mucous or muco-purulent exudate.

Purulent metritis is characterized by an intense inflammatory disturbance with an accumulation of pus in the uterine cavity. The uterine walls will be tumefied because of the extensive leucocytic infiltration. The infection and inflammatory process not infrequently extends and involves the contiguous peritoneum, producing metro-peritonitis.

Septic metritis is characterized by an intense inflammation of the uterine walls with an accompanying necrosis. The uterine cavity will contain quantities of a putrid fluid, the uterine mucosa may have sloughed or appear as a macerated, yellowish mass. There is usually thrombic formation in the uterine veins, and the Fallopian tubes and ovaries may be involved. In cases of septic metritis there is usually an involvement of the peritoneum. If the animal survives sufficiently long, metastasis and thrombic formation may occur in any part of the body.

Catarrhal metritis does not, as a rule, produce sufficiently constant symptoms to be readily identified. There will be a mucous or muco-purulent vaginal discharge, the affected animal will appear unthrifty, and there may or may not be a rise of temperature.

Purulent metritis is manifested by purulent vaginal discharge. The affected animal eats sparingly, if at all. There will be a rise of temperature. If the peritoneum is involved, the patient will evidence pain when forced to move.

Septic metritis has a sudden onset, there will be from four to six degrees rise of temperature. The animal has a tucked up appearance, there may or may not be a discharge of bloody fluid from the vagina. The patient will refuse feed, but may drink freely.

The course of metritis is variable, depending upon the intensity of the inflammatory process. The catarrhal type is usually subacute or chronic in nature. The purulent and septic types are invariably acute and the septic is usually fatal.

The treatment of metritis in sows has not been entirely satisfactory. It is difficult to apply local treatment because of the small size of the external genital opening. Thus far the most successful treatment has consisted of uterine irrigation. This treatment requires the dilatation of the vagina by means of a speculum, after which a small tube such as a horse catheter may be passed into the uterus and a dilute solution of tincture of iodine slowly and carefully injected. Some practitioners have reported splendid success by this method of treatment and the injection of one to four ounces of alcohol into the uterus, after the antiseptic solution had been re-



moved. The uterine douches should be repeated two or three times if necessary. Quinine bisulphate in 20 grain doses injected into the axillary space and repeated every twelve or twenty-four hours has been reported to be of value, particularly in cases of septic metritis.

[The JOURNAL would welcome a free discussion of this subject, which is becoming of more and more importance to the practitioner.—EDITOR.]

### PULMONARY ASCARIASIS IN YOUNG PIGS<sup>1</sup>

By H. B. RAFFENSPERGER, *Chicago, Ill.*

IN the course of a series of field investigations on the parasites of hogs in which I have been engaged during the past two years, I have seen many pronounced cases of pulmonary ascariasis, and have been able to verify the suggestion made by Ransom and Foster in 1917 on the basis of results obtained by them in experimental work that invasion of the lungs by *Ascaris* larvæ would probably often be found responsible for lung troubles among young pigs.

In this connection a recent experience is of interest. Dr. G. B. Blackman of Bloomington, Illinois, called my attention to a specimen of bronchial mucus from a young pig containing numerous *Ascaris* larvæ, sent to him for confirmation of a diagnosis made by Dr. H. R. Hornbaker of Bushnell, Illinois, in reference to a herd of pigs among which a considerable number had died following symptoms and under circumstances suggesting pulmonary ascariasis. Through the courtesy of Dr. Hornbaker I was enabled on October 8, 1920, to visit the herd in question and from this visit obtained the following information:

During the first week in September most of the fall litters were farrowed, nine sows giving birth to 87 pigs. Another sow gave birth to 15 pigs on September 21, making a total of 102, of which 9 were killed by overlying, so that there remained a net total of 93 pigs farrowed on this farm in September. The sows and pigs within two or three days after farrowing were placed in a small orchard; in fact, if I understood the owner correctly, some of the litters were farrowed in this orchard, an old shed being utilized as a farrowing pen. Earlier in the year the pigs farrowed in the spring had access to this orchard but were not confined to it. These pigs (68 shoats), after the farrowing of the fall pigs, were kept in a large pasture adjoining the orchard. In the latter part of the summer or in the autumn of 1919, the pigs that were farrowed the preceding spring were running in the orchard, and at this time were given an

<sup>1</sup> Contribution from the Zoological Division, U. S. Bureau of Animal Industry.

anthelmintic. Concerning the results of this treatment the owner stated that worms were scattered all over the orchard. The orchard thus through its occupancy for a considerable period by wormy pigs in 1919, including the time they were undergoing anthelmintic treatment, became heavily infested with *Ascaris* eggs. The pigs farrowed in the spring of 1920 had access to this orchard during the summer but apparently because of having acquired considerable resistance to *Ascaris* infection at the age which they had attained before using the orchard pasture did not become seriously infested, at least, not so seriously as to show marked symptoms. The failure of the spring pigs of 1920 to become seriously infested may also be partly explained by the fact that the development of *Ascaris* eggs to the infectious stage is likely to proceed very slowly, especially if the heat, moisture, and oxygen necessary to incubation are deficient. Accordingly, many of the eggs left in the orchard in the late summer or autumn of 1919 probably lay dormant over winter and did not reach the infectious stage until after the spring pigs had passed the most susceptible age. By September, 1920, however, there had been plenty of opportunity for even the most slowly developing eggs to reach the infectious stage, and thus when the newly farrowed pigs were placed in the orchard, conditions were ripe for the catastrophe that followed.

On September 26, some of the young pigs in the orchard "were off," as the owner expressed it; they were affected with "thumps" and refused to come up to the trough. In a few days a number had died. Dr. Hornbaker was called and made a tentative diagnosis of *Ascaris* pneumonia. The shoats in the adjoining pasture were normal, but on the request of the owner were immunized against cholera. The lung of one of the pigs that was sent to Dr. Blackman for laboratory examination showed the presence of many *Ascaris* larvæ, 15 being counted in a few drops of mucus from one of the bronchi.

On October 8 when I visited the farm the number of young pigs in the orchard had been reduced by death to 55, only 24 of which appeared normal, the others "thumping." Two of the pigs were killed and examined post mortem. *Ascaris* larvæ were found in the lungs of both. Seven larvæ were present in one microscopic preparation made from a few drops of mucus taken from the right bronchus of the first pig killed. The contents of a small portion of the jejunum of this pig were poured upon a piece of black tar paper and diluted with water. Without the use of a lens this crude method of examination showed 22 small ascarids varying in length from 6

to 17 mm. No doubt many others were overlooked, and no doubt also more were present in the remainder of the small intestine which was not examined.

The evidence that the losses among the pigs on this farm were the result of pulmonary ascariasis is very clear from the history, symptoms, and post-mortem examinations. Such losses are of common occurrence on farms where no adequate precautions are taken against ascariasis among young pigs, though usually the percentage of loss is not so high. There was here a death loss of over 40 per cent, probably increased later, as over half of the surviving pigs at the time of my visit to the farm were showing marked symptoms of pulmonary ascariasis. In addition to the death loss there is also to be considered an indefinite loss from stunting of growth that will occur among the surviving pigs. We know that pigs recovering from an attack of pulmonary ascariasis commonly are permanently stunted and do not afterward grow properly even if placed under the most favorable conditions as to feed and care. Accordingly, the damage to his fall pig crop experienced by this farmer may be conservatively estimated at not less than 70 per cent, all of which could have been avoided by proper management.

The following plan of managing young pigs to avoid losses from *Ascaris* has given good results on the farms where it has been tested, especially in those cases in which it has been carefully followed. Farrowing pens are thoroughly cleaned. A week or ten days before farrowing sows are scrubbed to remove dirt adherent to the skin and are placed in the clean pens that have been prepared for them. The removal of dirt from the skin of the sows is considered important as such dirt picked up in wallows and long-used hog lots is liable to be heavily laden with *Ascaris* eggs in the infectious stage. It is quite possible for pigs to swallow many of these eggs while suckling. Hence the apparent importance of having the skin of the sows clean when they are placed in the farrowing pens. Ten or twelve days after farrowing, or even sooner, the sows and pigs are removed to pastures or fields that have been plowed and on which a crop has been grown since their previous occupancy by hogs. From the time they are born until after they are weaned the pigs, though exposed to the possibility of infection from the brood sows, are strictly excluded from pens, buildings, yards, fields, and pastures that have been frequented by other hogs, and hence likely to be more or less heavily contaminated with *Ascaris*. The amount of infection to which the pigs are exposed by association with the

possibly infested brood sows is not likely to be serious, as freshly deposited *Ascaris* eggs usually require several weeks at least to develop to the infectious stage, so that the risk attending the association of possibly infested sows and their pigs until the latter are weaned does not appear to be very great, especially if the animals are allowed ample range on a clean field or pasture.

The plan above outlined, though it may not always prevent slight infection, is designed to minimize the chances of serious infection during early life and until the pigs are old enough to have become fairly resistant or at least tolerant to the attacks of *Ascaris*. The severe effects often produced by this parasite upon pigs under three months of age are rarely observed among pigs that have escaped infection during the first three months of life. Even though they afterwards become infected they seldom show the marked symptoms of ascariasis so often seen among younger animals.

In conclusion, I may note that the outbreak of pulmonary ascariasis reported in this paper not only exemplifies the importance of excluding young pigs from places infested by *Ascaris* but also affords an opportunity of pointing out the importance of confining pigs during anthelmintic treatment, in a place that can afterwards be thoroughly cleaned, and that at least will not be used for keeping young pigs. Whether or not in the present instance the treatment of the wormy pigs in the orchard rendered the orchard much more dangerous than it would otherwise have been, it is nevertheless obviously bad practice to allow pigs during treatment for worms or immediately afterwards to roam over a pasture that will later be used again for pigs.

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### CONGENITAL STENOSIS OF THE DUODENUM

By OSCAR SCHRECK, *New Haven, Conn.*

A female Dalmatian pup was apparently well until six days old, when the pup vomited blood, with some choking, coldness of the body and extremities, and paleness of all the visible mucous membranes.

This vomiting was repeated at intervals for 6 or 7 hours. The bowels did not move so far as is known. The pup at this time refused to suckle the bitch, and the owner, a breeder of dogs, gave the pup milk and port wine, as I directed over the telephone.

There was a slight improvement in suckling. On the seventh day,

vomiting of a large amount of dark brown, or chocolate colored fluid, which was quite sticky, again took place.

Death of the animal occurred on the eighth day. Autopsy showed the stomach greatly dilated, the duodenum distended and terminating abruptly just in front of the orifice of the bile duct.

Pressure brought to bear with the fingers could not force the fluid in the stomach behind this point, nor could the gas present below the stenosis be forced forward from the intestines.

In making my examination, I inserted in the rectum a long thermometer the whole length, and on taking it out it was not soiled with feces, still the pup strained frequently as if the bowels were going to move.

In the esophagus, immediately behind the cardiac orifice, was a dark, firm, thrombus in the mucous membrane, about two centimeters in length, firmly attached to the wall. This was in all probability the source of the hematemesis.

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### EFFECT OF DIPPING DAIRY COWS AS REGARDS MILK PRODUCTION

By FREDERICK TORRANCE

*Veterinary Director General, Ottawa, Canada*

DURING the dipping of cattle for the eradication of mange in the southern part of the Province of Alberta, Canada, some careful records were kept of the milk production of eighty-seven dairy cows for two days preceding and two days after dipping, and the following figures were obtained:

Total milk produced by the 87 cows: June 24, 3,128.4 pounds; June 25, 3,101.4 pounds; dip, June 26, 3,051.9 pounds; June 27, 3,113.6 pounds.

Average per cow: June 24, 35.15 pounds; June 25, 34.84 pounds; dip, June 26, 34.27 pounds; June 27, 34.98 pounds.

This shows the effect on milk production of the dipping of this dairy herd in the official lime and sulphur solution in the standard cage vat when the temperature was maintained at from 110° F. to 118° F.

It is evident that the objection of many stockmen to the dipping of milch cows is not well founded, as they can be dipped without affecting the secretion of milk to any appreciable extent.



## ABSTRACTS

OBSERVATIONS CONCERNING FOOT-AND-MOUTH DISEASE. Berschey et al. Schweiz. Arch. Tierheilk., Jan., 1920. Reviewed in Rev. Gén. Méd. Vét., Nov. 15, 1920, by L. Spartz.

During the latter part of 1919 foot-and-mouth disease broke out with such severity in the canton of Fribourg that the authorities decided to effect control by slaughtering all affected and contaminated subjects. Butchers followed the veterinarians in their tours of inspection and slaughtered and dressed the animals *sur place*. After the campaign had been carried out on some fifty stables it was found that in spite of the enormous expense and drain on the cantonal budget the epizootic was gaining ground day by day.

In the course of these inspections Messrs. Berschey, father and son, found that the affection was very benign in stables where the water supply came through ordinary iron pipes, notably if the conduits were more than 20 to 30 meters long, but that the symptoms were very severe where the supply flowed through wooden, cement, ceramic or galvanized iron pipes. This rather queer observation suggested the idea that iron plays a specific role against the disease.

The Berschey's are of the opinion that the organism should contain at least the minimum quantity of iron to assure proper action of the various physiological functions and to endow the body with adequate resistance to infections, especially foot-and-mouth disease. If the minimum content does not obtain, the symptoms are alarming, while if the organism contains the minimum or surpasses it the disease assumes a benign form.

Many practitioners do not ignore the fact that the disease is always more grave in fresh cows or those in the last days of gestation; that is to say, animals obliged to cede iron to the calf in the process of formation and reduce the iron content of their bodies to the minimum.

From this order of ideas the Berschey's directed that three to five grams of iron sulphate be administered as a preventive during a period of four to six weeks. All the animals thus treated contracted only small vesicles, two or three the size of a pin-head, and the appetite and lactation were not altered.

The authors also treated the disease by intravenous injections of eight grams of iron sulphate in normal salt solution, but as the administration was cumbersome for rural practice, iron cacodylate

hypodermically was substituted. One gram in 50 of distilled water was the dosage. The results have been so surprising that it has been decided to extend the experimental work with this medicament.

At present they recommend that preventive doses of iron sulphate be administered to exposed animals when panzoötics break out, and while not making any pretensions to scientific research as to the action of iron in this connection, they are of the opinion that the grave epizoötic throughout Europe at this time is due to a lack of iron in the feeds, the iron-containing feeds having been reserved for human food. Animals were obliged to draw the iron supply from the water flowing through iron pipes, and where the amount was not sufficient the organic equilibrium was upset to a point where the feeblest of contagions were sufficient to start up serious outbreaks.

Mayr, professor in the veterinary college at Munich and editor of the *Münchener Tierärztliche Wochenschrift*, approves the conclusions of Berschey, having found as early as 1895 that the replacement of wooden conduits by iron ones had a beneficial influence in the course and the duration of foot-and-mouth disease, but gives as his opinion that it is not the mere augmentation of the iron content of the organism, but the oligodynamic power of metals upon bacteria that is the helpful influence. The term "oligodynamic function" was introduced into science by Von Nageli, a botanist of Zurich, to designate the effect of certain solutions on algæ. Stupfle, Steck and Rosenkranz, taking up the work of Von Nageli, showed that the heavy metals (copper, mercury, silver) gave an oligodynamic function to water that was apt to kill the cells of algæ, bacteria and protozoa, and that this property was retained by the water for some time after it left the flow pipe.

Mayr opines that the success of Berschey in the treatment of foot-and-mouth disease by the administration of sulphate of iron per os is due solely to the disinfection of the contents of the rumen.

According to Klein (*Deutsche Tierärztliche Wochenschrift*, May 15, 1920), the work of Berschey as regards the value of water flowing through iron pipes in the treatment of foot-and-mouth disease is worthy of being confirmed, but it seems to him that from a physiologic point of view it is premature to credit iron with a protective action, and besides the intravenous injections of the sulphate recommended are not without danger.

Bohm (*Münchener Tierärztliche Wochenschrift*, 1920, reviewed in *Schweizer Archiv*, July, 1920), referring to his previous publications

(1916), in which he presents the idea that certain relations exist between the radiations of the soil and foot-and-mouth disease, says it would be well in infected regions to study the permeability of the soil, its content of water, its strata and radioactive rocks, and the influence which flowing water in the strata known to be radioactive may exert on the lesions of the mouth and hoofs. The oligodynamic function of water flowing through iron pipes is attributed to the rays produced in the strata over which the water has flown. These rays produce "activating" transformations in water which give it the property of attenuating or of killing viruses like the rays of radium. It has been shown that the minerals like iron, copper and silver emit rays that kill bacteria, and that water, glass vessels, wadding, etc., brought into contact with radiating bodies contract radioactive properties. Radiobiologic experiments made upon mushrooms, bacteria and seed grains have demonstrated that the rays of radium, especially the ray x, annihilates germination and may even destroy the cells. The rays p and y influence also the nuclei of cells and in large doses may disorganize the plasma. According to Bohm the work of Berschey should be placed to the account of radioactivity.

Bizarre as these findings and discussions may seem, they have been so seriously discussed among the veterinarians of continental Europe that it was thought quite in order to record them in our current literature.

L. A. MERILLAT.

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RECENT EXPERIMENTAL STUDIES ON THE VACCINATION OF CATTLE  
AGAINST TUBERCULOSIS. A Calmette and C. Guérin. *Annales  
de l'Institut Pasteur* (1920), Vol. XXXIV, No. 9, p. 553.

A culture of bovine tubercle bacilli repeatedly transferred on a glycerine-bile medium for a long period became avirulent for cattle, monkeys, and guinea pigs even when injected in large doses intravenously. Animals so treated showed complete immunity to a test inoculation given intravenously thirty days later. The authors instituted an experiment on November 21, 1912, in which they sought to test the duration of this immunity against natural infection. They used ten calves aged from nine to ten months, all free from tuberculosis; four of these served as controls, and the six others were injected intravenously with 20 mgs. of bovine bacilli (880 millions) from a two weeks old culture (70th transfer on bile-potato). All of these animals were placed in a stable directly behind five adult tuberculous cattle in such a manner as to favor a constant natural contamination of the bedding and feed of the experi-

mental animals. One year after beginning the experiment, three of the vaccinated calves were again injected with 20 mgs. of culture (89th transfer) and one year later two of these same animals were given a third injection of culture (113th transfer). The tuberculin test applied one year after starting the experiment showed three of the four controls and one of the vaccinated animals to be reactors; two of the vaccinated animals gave doubtful reactions. (It is known that in a certain number of cases, the presence of avirulent bacilli in the organism may produce a sensitivity to tuberculin.) Another test at eighteen months showed the same three controls reacting, but none of the vaccinated animals. A third test thirty-two months after beginning the experiment resulted in positive reactions in the three previously reacting controls and in two of the vaccinated animals (the latter had received only one injection at the outset of the experiment). On account of conditions brought on by the German occupation, the experiment was brought to a close on October 1, 1915, or about thirty-four months after its inception. All the animals were slaughtered and at autopsy the three reacting controls were all found tuberculous; the one control which had never reacted was free from tuberculosis; the two reacting vaccinated animals (vaccinated only once) were also diseased; the third test animal vaccinated but once was healthy, as were also the calf vaccinated twice, and the two animals vaccinated a third time.

In order to test the practical value of this method of vaccination, the authors believe that it would be desirable to use a larger number of cattle and continue the test through a period corresponding to the average life of the bovine. Calmette's vaccine has the merit of being non-tuberculogenic, differing in this respect from von Behring's bovovaccine and Koch and Schutz's tauruman.

L. T. GILTNER.

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THE NEW GERMAN ARMY VETERINARY SERVICE. *Jour. Méd. Vét. et Zoötech.* (Abst. in *Vet. Rec.*, Nov. 27, 1920, by W. R. C.)

The German "army of the realm" has been reduced to an effective of 200,000 men, and its veterinary service has been reconstituted upon new lines as follows:

The veterinary inspector is at the head of the Army Veterinary Corps.

The veterinary inspector's duty is to superintend all the services and visit the establishments in relation with the Veterinary Corps, and to occupy himself with everything connected with the equipment

of army veterinary surgeons. He is, at the same time, the Chief of the Veterinary Section of the Ministry of War.

The veterinary inspector has two sections, numbered I and II, under his orders.

Section I, placed under the direction of a Veterinary-Major, manages the conditions of service of the veterinary surgeons, the army service for contagious diseases, hygiene and statistics, and the organization of the veterinary service and the effective service.

Section II controls veterinary equipment, laboratories and veterinary depots, farrieries, infirmaries, drugs, feeding, shoeing, meat inspection, and farriers.

A third section is related to the Commissariat. It sees to materials for shoeing, slaughter, vehicles, and harness.

The schools of farriery of Berlin, Hanover, and Munich, the veterinary laboratory, and the veterinary depot, are placed under the direction of the veterinary section. The laboratory and the depot are annexed to the school of farriery of Berlin.

Each of the four groups of the army contains a divisional veterinary surgeon, with residence at Cassel, Berlin, Kolberg, and Munich.

The staff of the twenty brigades of the army contains a brigade veterinarian and a deputy. The veterinary corps of each brigade number, on an average, 13 veterinary officers.

In 1914, the veterinary corps of the army comprised 883 veterinary officers. In the army of 200,000 men there are only 342, of which 247 are in Prussia and Baden, 51 in Bavaria, 31 in Saxony, and 13 in Wurtemberg.

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The importance of tick eradication is indicated by a letter from an East St. Louis stockyard firm to a county agent in Arkansas regarding a shipment of 25,000 pounds of cattle from one of the infested areas. These cattle, while in prime condition, were placed in the quarantine pen because of the locality from which they originated. The difference in location caused a reduction estimated at 35 cents per hundredweight, or \$87.50 on a single carload. Cattle of practically the same grade from an adjoining county which has been freed of ticks sold for a higher price.

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Wild horses on the Colville (Wash.) Indian Reservation are being shot and eaten by stockmen, according to a statement by Grant Copeland. Small horses have become numerous, very wild, and a nuisance on the reservation, where they eat the grass and are fat.—*Pacific Homestead.*



## REVIEW

### A NEW BOOK ON BOTANY

"PASTORAL AND AGRICULTURAL BOTANY" is the title of a text-book for the study of the injurious and useful plants of country and farm, recently published by John W. Harshberger, Ph.D., formerly Professor of Botany at the University of Pennsylvania.

The chapters on poisonous plants are of especial interest to all concerned in livestock production on grazing lands. The control of losses from poisonous plants in range animals is one of the most important and perplexing problems affecting the livestock industry. No reliable data on the aggregate losses from forage poisoning have been published, but there are numerous records on file showing fatalities as high as 50 per cent in single herds and flocks, and certainly the aggregate losses suffered by the livestock industry in this country run into the millions. The United States Department of Agriculture and State agricultural experiment stations have been studying this problem for years. Much of value has already been published, and it has been urged that veterinary colleges give more attention to this subject in the arrangement of their courses of study.

"Pastoral and Agricultural Botany" is a concise little book which presents an attractive appearance and is admirably suited in scope, arrangement and subject matter not only for use as a text-book but as a source of valuable information for veterinary practitioners and livestock owners.

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*Orchard and Farm* says: "California leads the nation in the number of milk goats. Switzerland, with an area of only 16,000 square miles, supports about 400,000 goats. California has plenty of room greatly to increase the present number. To aid in the upbuilding of the milk-goat industry, the College of Agriculture is now offering a correspondence course on milk-goat raising."

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*Wisconsin Farmer* says: "Now that the eradication of livestock tuberculosis has received a good start and livestock owners all over the State are expressing their approval of the campaign, we can not afford to allow it to be hampered in any way, and the State legislature can do nothing better than to make an appropriation in keeping with its importance and value."

## ARMY VETERINARY SERVICE

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### SCHOOL OF MEAT AND DAIRY HYGIENE

The Veterinary School of Meat and Dairy Hygiene completed its first regular session on December 15. The next regular course began January 15, 1921, with the following officers in attendance:

Major Walter Fraser, Major William A. Sproule, Capt. Edward I. Cheely, Capt. Aquila Mitchell, Capt. Herbert S. Williams, First Lieut. Everett C. Conant, and Second Lieut. Oscar C. Schwalm.

The inspection of meat and dairy products and forage at time of purchase and at issue pertains to the routine duties of all veterinary officers and certain selected enlisted men. The graduate of a veterinary college today receives extensive instruction along these lines and the course at Chicago is in the nature of post graduate training, both theoretical and practical, in the special duties of the army veterinary officer. With the advantage of his professional knowledge, it has been found practicable to qualify the veterinary officer in this work by a 5 months' course of intensive training. This is of material importance in securing efficient inspections, because the examination of food supplies of animal origin is a highly specialized branch of science of which the non-professional man lacking the required basic education can never acquire more than a superficial knowledge. These inspections are essentially sanitary, being designed to protect the health of troops and from the nature of things fit in with the general sanitary work of the Medical Department.

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The action of the War Department in making the veterinary service responsible for all meat and dairy inspection for the Army, as was done in 1918, is a most logical procedure. All such supplies receive a veterinary inspection when acquired at the central purchasing points and so far as personnel is available when issued and when bought locally. The limited number of veterinary officers and enlisted men available has been the only obstacle to prevent the Surgeon General from fully meeting the demands of the service and maintaining proper inspections at all stations.

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All the meat used by China and the Philippines is bought in China where the Veterinary Corps has operated an inspection force for several years. Similar work is carried on in the Canal Zone.

### CALLING RESERVE OFFICERS TO ACTIVE DUTY

Under the above title, War Department Circular No. 420 states:

"The War Department has authorized a sufficient number of officers of the Veterinary Reserve Corps to be called to active duty to raise the total number of officers (Regular, Emergency, and Reserve) of the Veterinary Corps to 175, the number of officers authorized by law for the Veterinary Corps. All officers of the Veterinary Reserve Corps above referred to will be relieved from active duty June 30, 1921, or prior to that time, as permanent appointments in the Veterinary Corps fill existing vacancies, the total of 175 not to be exceeded at any time."

There are at present 163 officers in the Veterinary Corps, Regular Army, in the following grades:

Colonel, 3; Lieutenant Colonel, 5; Major, 17; Captain, 29; First Lieutenant, 83; Second Lieutenant, 26.

By authority contained in War Department Circular No. 420, twelve officers of the Veterinary Reserve Corps in the following grades have been called to active duty: Captain, 2; First Lieutenant, 8; Second Lieutenant, 2.

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### WAR HORSE MEMORIAL

An elaborate memorial, costing \$150,000, is to be erected in London in memory of the 346,130 British horse casualties, not to speak of the million of other countries' animal losses. The Royal Society for the Prevention of Cruelty to Animals is behind this movement to commemorate the memory of these wonderful animals, which fought so valiantly on the command of their riders and drivers.

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Lieutenant G. A. Handley has resigned from the Army and has moved from Fortress Monroe, Va., to Ironton, Ohio, where he will engage in general practice.

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Dr. Harry E. Ewing has resigned his commission in the Veterinary Corps, U. S. A., and is again located at Columbus, Ohio, in connection with the City Board of Health.

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Lieutenant Theodore Schandou, formerly at Camp Dix and more recently at Fort Bliss, Texas, has resigned from the Army and is looking for a good location in Texas or New Mexico, where he will again take up the practice of his profession.

## ASSOCIATION NEWS

### AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,  
Ohio, August 23 to 27, 1920

*(Continued from the January JOURNAL)*

#### SECTION OF COLLEGE FACULTIES AND EXAMINING BOARDS

TUESDAY MORNING, AUGUST 24, 1920

THE meeting was called to order at 10 a. m. by the Chairman, Dr. Reuben Hilty, of Toledo, Ohio.

CHAIRMAN HILTY: This is the first time since I have been in this section that we have had a real program, and it ought to be a milestone in this section of the Association. The first thing on the program is the report of the Secretary, Dr. H. S. Murphey, of Ames, Iowa.

DR. MURPHEY: The report and the minutes of the last meeting were published in the JOURNAL, and I think that they will be adopted as published. I have no further report to make.

(A member moved that the report be received, which motion was seconded and carried.)

CHAIRMAN HILTY: We will now listen to the first paper on "College Training for Bureau of Animal Industry Veterinarians," by Dr. J. R. Mohler, of Washington, D. C.

(Dr. Mohler's address will appear in a later issue of the JOURNAL.)

CHAIRMAN HILTY: This to me has been a wonderful paper, the most interesting one I have ever heard upon this subject. Does anyone desire to discuss the paper, or to ask any question? It seems that the Doctor has covered the subject so thoroughly that nobody cares to enter further into it.

The next paper is on the subject of "Veterinary Training from the State Board Standpoint," by Dr. C. W. Fogle, of Leipsic, Ohio.

(Dr. Fogle read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: The next paper in order is one by Dr. Planz on "Training Veterinarians for General Practice," but as Dr. Planz is not here I am going to call upon Dr. Cooley, of Cleveland, to give us a few words on that subject.

DR. COOLEY: My experience on examination boards and my long experience as a practitioner may account for the remarks that I am going to make in regard to this question. The training of the

veterinarian for general practice is a question of great importance. I have been talking with the physicians at our Cleveland Academy of Medicine, and they have been laying a great deal of stress upon entrance requirements with reference to preparation for the medical profession. I have heard them say—and you can all be the judges as to whether it will ever be applicable in our profession—that when a man has his four years of high school, and then the college requirements to get into the college, and then takes up a great number of hours of medical study, he is likely to be educated away from some of the spots and locations that need medical work and men.

I don't agree with anybody in saying that we should not prepare ourselves in the best possible way, but with a lot of the schools offering what they do in reference to the preparation of students, it does seem to me that we are laying too much stress upon that condition, and then allowing the back door to be opened, and a lot of them getting through in that way.

Yesterday I was much surprised in our committee to hear it said that the London Correspondence School now had been practically deprived of Canadian help, but was receiving a revenue of upward of \$40,000 from registrations from the United States, and that the registration amounts to 2,300 students. We have a committee in this section to deal with such matters, and I understand there is a law that will take charge of that particular phase of the question.

In considering the courses of study in our veterinary colleges, consideration should be given to the proper and necessary training of practitioners. There are many men who can take up college work and stand well in the examinations but who have not been endowed with that natural ability that nature gives to some men for that kind of work. It is necessary to provide a lot of practical teaching for the good of the profession. When a man gets into the field of practice he must deal with stock owners who are supplied with a great amount of practical judgment and sense about livestock, and he must go out ready to cope with them. My advice is that in training men for veterinary practice they should be well prepared for this phase of their work.

I can not say much to you men who are giving your time to the teaching of students in veterinary work. I feel timid in trying to advise such men as I have heard in reference to this matter.

CHAIRMAN HILTY: We are grateful to Dr. Cooley for his impromptu remarks. Does anyone care to say anything further on that subject, the training of the veterinarian for general practice?

Dr. LOWE: I was interested in Dr. Cooley's talk, and I agree practically with everything which he said. As a member of the State Board of Veterinary Examiners of New Jersey I have been wondering if the State board of the future will have as important a place as a working body as it has had in the past. It seems to me that if it is the fact that in the affairs of the colleges the A. M. V. A. is recognized, and that this Association recognizes these



students, it should be a pretty good recommendation for them to come into the State.

The men who are conducting the examinations sometimes do not know the answers that are received, and sometimes the questions that are asked by the examiners show that they, perhaps, have made some of the trouble. I have many times thought that perhaps that there was too much examining, and that a man who comes from these schools should be recognized in every State of the Union. Sometimes the men that do the examining are biased, or have their own ideas. I think they should sometimes take other views than their own. We have under our law twenty different subjects on which applicants are examined, and in many instances questions are duplicated. I think that some time in the future things will be changed a little bit.

CHAIRMAN HILTY: Has anyone else anything to say on this subject?

Dr. CHRISMAN: I have served on the examining board, and have served on other boards, and in a business way in transacting business when one of the other members was absent. The powers that be in the different States sometimes single out certain men for appointment as examiners, and these gentlemen meet in a certain city to hold the examination. The men who take it are preparing to take up the practice of the profession. These examiners try to find out in a short period—says eight to ten hours—how much these applicants know, and are disappointed to find that these men can't tell it all in that time. I wonder sometimes whether we are giving these gentlemen a fair chance for entrance into the profession. That is the question—and it is really important—whether we are giving the college graduate a real, fair chance to start in the profession.

Let us go back to the days when we came up to be examined before the State Board of Examiners. We were young and more or less excited; we were in a strange city, most likely, and we were frightened and distressed, and wished that we had never started to practice anyhow. I know that is just what happened to me. And we were told that the examinations were to be conducted by men who would make it as difficult as possible—men who would go out and "pluck" you; and we started in with fear and trembling. When I took the examination I was young and green as anybody who ever entered college. The men who were examining me were of years, 65 or along there, with long whiskers; and they got us down there in a sweat box, where we got our grinding, and I am wondering today just how much or little we knew about therapeutics, etc. We were all shaking in our boots, half scared to death. I don't think that is a good method or a sure way of finding out how much a man knows.

Isn't it a much fairer proposition to take the college diploma that we recognize in the A. M. V. A., and take that as a standard for entrance into practice, than to go before the boards? Let us think about that.

One thing that has appealed to me in regard to a four-year high-school entrance requirement for colleges is plain English. Many men who have graduated from colleges and come up to take the State board examination, and expect to practice, can not spell ordinary words, the ordinary terms that they have to use; and if you didn't know what were the questions you had given them, or what you had asked, you never would recognize them by the spelling that is given there. If a man can not spell the terms he expects to use, and that he needs through life and in the practice of his profession, he is in bad shape. We need good English, and we should impress upon them to study to use and speak good English. We should require that when they come before the examining boards.

Being for a number of years on the examining board, I have had an opportunity to observe those that come before the examining boards, and generally we find them lacking in their English, and many are not capable of framing their answers and putting them on paper.

In teaching I tell the students that language is nothing more nor less than the vehicle in which they transfer their ideas to me. If they hitch their ideas to a poor and broken-down vehicle, they can not expect them to reach me in the proper form. I think that English is one of the greatest things on which we should lay stress.

CHAIRMAN HILTY: In my experience of some eight years on the Ohio State board I have found that same thing, and I have found that the man who knows the least writes the longest paper. I always feel the greatest responsibility when I am grading a lot of papers. I ask myself, Has this young man ever had the proper training? Does he know, but is simply not able to express himself on paper? If I think he knows, I will overlook a lot of things. If I find that he has had opportunities and has not informed himself, I am going to grade his paper mighty close. I must be convinced in my mind.

Dr. HOSKINS: The Doctor has touched upon a point that ought to be brought out further. We are up against a difficulty. We know very well that the State boards have changed from year to year, because in about two-thirds of the States the appointments of members on State boards is a prerogative of the Governor. We have a minimum standard of entrance requirement, and a minimum standard for veterinary schools.

It seems to me, in view of the fact that these boards come into existence in this way, and are controlled, so far as changes are concerned, in this way, that the time has arrived when a reformation of such laws should take place, and that there should be attempted a rule that a presentation of a diploma from the school that the applicant has complied with the standards of requirements of the A. V. M. A., with the additional recognition of the A. V. M. A. as a body, that that shall define their standing for veterinary education, not medical.

I find men who come before us with a veterinary certificate based upon a high-school diploma in the State of New York who, when they come to write the papers, can not spell, their grammatical ex-

pressions are wrong, and the writing is of the poorest. It is not always that man who shows the evidences of lack of the fundamentals; but I think there is something radically wrong in many high schools in allowing these men to go out from them, because as we all know there is not a good impression of an applicant whose writing and grammar and spelling are of the poorest.

The question of the aptitude of the men, and their qualifications for entering the school, is far more defined and definite today, in my mind, than it has been for a period of twenty years, for the very reason that there is a high entrance requirement to the veterinary schools; but that has limited the number of schools. Many have gone out of existence in this country, and so, perhaps, we are not able to judge of the aptitude and qualifications of our students, especially as to the question of a preliminary education. That is true in New York in the University with which I am connected. This year they have 275 applicants for entrance in their medical school, and out of that number they have selected 150. They have begun to know the applicants from experience—those most earnest among the people who enter the State veterinary schools. We know their problems, and what it will cost. They figure that it will require an expenditure of \$600 a year for every one of the 150 men to be educated in the four years' course. On the other hand, the University will receive about \$1,100 in these four years; therefore, the University must raise \$1,300 additional to educate these men in the field of medicine.

It is not possible that the people will furnish the State with a liberal enough support for State veterinary schools, and we must go out and get the agricultural communities to give a sufficient amount of money to maintain and equip the veterinary schools properly in order that they may give this professional education which has been laid before us so splendidly by Dr. Mohler.

But there is also another side to this question—these four years of preliminary education, and two years of pre-medical course with our universities, and four years of medical course. Last year a most bitter fight resulted in New York from the necessity of asking the State for a large appropriation of money that surgical skill might be contributed to many communities in the State to which this higher education would not go. Dr. Downey stated that there were thousands of places in the State of New York, in rural communities, that have no veterinarians, but the veterinarians don't seem to want to go there. They prefer to go into the Bureau of Animal Industry, where they will receive \$1,400 or \$1,500 a year. There are many who prefer this, and enter the profession with this end in view. There are many that have entered the veterinary field in the last thirteen years.

CHAIRMAN HILTY: Is there anyone else who wishes to say anything along this line?

Dr. MOORE: I would like to say a word regarding what has been said relating to the State Board of Examiners. I would like to say this from a teacher's standpoint.

I would certainly like to see the State Examining Commission maintained. I would not like to see the State Examining Commission done away with in any way as long as I am teaching veterinary medicine. I find that we do not have all honest students to deal with, and I suspect that every teacher finds this to be true. When they get by one obstacle they think that they are practically safe; and the fact that the State Board is going into this and that subject enables you to get more men interested than you could in any other way. I have found that to be my experience, and I wouldn't like to see the State Board of Examiners abandoned. Every student should realize that after he passes through the college he is not entitled to go out and practice, but that he must have further pathological information before he can accomplish what he has started out to do. I am in favor of their continuance, and I think that all of these things are calculated to impress upon the student the necessity of hard work if he is going to accomplish what he started out to do, and if we are going to educate him.

CHAIRMAN HILTY: Is there anyone else who desires to talk on this subject?

A MEMBER: One of our members, who I understand is in good standing, is conducting a correspondence school of veterinary medicine.

Dr. MURPHEY: I am glad to have learned this morning that this matter of the correspondence school will be taken care of by the Resolutions Committee, and I think that if sufficient information can be shown to the Post Office Department that it is a fraud, it can be stopped.

Dr. HOSKINS: It utterly failed in so far as getting it stopped in Canada. The only thing they did accomplish was that they got dozens of newspapers in the country to refuse to take their advertisements. I can not say how we should direct the action, or go after the Postmaster General to do it, for the reason that the Scranton Correspondence School comes under that subject somewhat, and they felt that it was impossible to get any relief at all through the Post Office Department. Bear in mind that the Scranton School is only one in very many. Some of the medical schools today are carrying on correspondence schools on live subjects, and they are finding men who are graduates in medicine—and they are fine men—who will go into the city or State where these schools are located, and will spend two or three weeks in daily instruction, and then give them a certificate. It is a hard problem to get the Post Office Department to take action, and where to draw the line is the problem. Most of the old religious papers cut the advertisements; they won't deal with them, and say that they carry advertisements only that show honesty of intention on their face.

Dr. MURPHEY: I have a letter from Dr. McGilvray regarding this, in which he said that they had to pass a law up there which would prohibit this in Canada. It seems to me that we have won our point, which would overcome the objection that Dr. Hoskins has mentioned.



Dr. COOLEY: I also had notice from Dr. McGilvray that they have taken care of that question in Canada, and it is up to the States to take care of it here. Just what method we should operate under I don't know, but I feel that this section of the A. V. M. A. as a whole should take action on this strongly, so we will know just where we stand on this question. Dr. McGilvray has prepared his notes with reference to the matter for our consideration.

Dr. WHITE: There is one phase that Dr. Cooley did not cover. They are willing to stop doing business in Canada, provided they are not interfered with in so-called interstate trade or business in the United States.

Dr. HOOD: There is another phase. They are located in a large building, and in their advertisements they have cuts made of the building, or which show the building in which their schools or offices are located; and they try to give the impression, and really do carry the impression, that that is the school, instead of that it is only the office building and they have just two or three rooms as offices.

Dr. HILTY: Dr. White, as Chairman of the Resolutions Committee, you will see that these things are embodied?

Dr. WHITE: Yes.

CHAIRMAN HILTY: We will now go to the next paper, "The Future Training of Veterinarians Particularly for Teaching," by Dr. D. S. White, Columbus, Ohio.

Dr. WHITE: The subject assigned me I have taken merely as a text, so it will seem that some of this paper will appear absolutely irrelevant to the subject.

(Dr. White read his paper, which will be published in a later issue of the JOURNAL.)

Adjournment.

#### WEDNESDAY AFTERNOON, AUGUST 25, 1920

The section reassembled at 2 p. m., Chairman Hilty presiding.

CHAIRMAN HILTY: We will have a paper by Dr. George A. Dick, West Philadelphia, Pennsylvania, on "Animal Husbandry in the Veterinary Curriculum."

(Dr. Dick read his paper, which will appear in a later issue of the JOURNAL.)

CHAIRMAN HILTY: We will pass now to the paper of Dr. V. A. Moore on "The Purpose of Laboratory Work in Veterinary Colleges."

(Dr. Moore read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: We will proceed to the next paper, on "The Training of Veterinarians for Research," by Dr. L. W. Goss, of Columbus, Ohio.

(Dr. Goss read his paper, which will be published in a later issue of the JOURNAL.)

CHAIRMAN HILTY: The next thing in order will be the election of officers for the next year. The arrangement heretofore has been that we shall have for one year a man from the examining boards, as chairman for the following year, or a man from the college fac-



ulty or the educational side as chairman, and the secretary from the other side. What will be your pleasure?

Dr. MURPHEY: I have been informed that there have been a number of petitions presented, an exceptional number, relative to a new section or division, one relating to the educational part and another to laboratory work. There has been a petition for a section in laboratory work. The Executive Board has full power to designate the sections, and I understand that they expect to make a recommendation to the association to pass it without qualification. I believe they propose to change the name of this section to that of Education and Research, and then that will include the laboratory workers as well as the teachers and State veterinarians. I think we should make our nominations at this time with that in view.

A MEMBER: I move that, inasmuch as we have had an unusual program presented to the section at this meeting, the present officers be continued, and that we reelect them for the coming year.

Dr. HILTY: Not at all, Doctor, so far as I am concerned, for next year for once I want to go to some Veterinary Medical Association meeting where I will have nothing absolutely to do with it.

Dr. MOORE: It seems to me that this section is, at the present time, a concrete part in the educational lines. I regret very much that the arrangement of the section has been such that the college men could not be admitted. A few years ago there was another association, a State college association, that was organized some years ago when the standards of the A. V. M. A. were not so varied as they are now, for the purpose of looking after the interests of veterinary education in the State schools. That association seems to have had a very important function to perform, and I confess for myself I do not see that it accomplished a great deal.

The college alumni are eligible to the A. V. M. A., and it seems to me that it would be just as well if that other association were disbanded. Advanced veterinary education methods should be adopted if we are to continue, and this should be centered in this section. In the meeting at New Orleans last year such action was taken, and that association has become dissolved, so to speak. This is the only section in which matters pertaining to college curricula, methods of teaching, etc., have come. I fail to see any objection to this change that Dr. Murphey has mentioned. It would offer this section a splendid opportunity. The laboratory men could have one session and the teaching or examining boards have the other session in which these topics could be presented. I should like to see some arrangement made by which some of the many real problems involved in veterinary education could be presented and discussed.

I feel that we can not accomplish much by preparing a paper as I did at the last minute. We haven't given it the time it should have. But if we could take up the question of laboratory training in veterinary colleges, the same man for a year, or half a year, and have others interested in it, doing the same thing, and discussing it and analyzing it for the purpose of putting it before us—that is what we want.

CHAIRMAN HILTY: May we have a nomination for Chairman of this section?

Dr. MOORE: I rise to nominate Dr. F. W. Chamberlain, of Lansing, Michigan.

(The nomination was seconded. It was moved, seconded and carried that the nominations close and that the Secretary be instructed to cast the unanimous ballot of the section for Dr. Chamberlain. That was done, and Dr. Chamberlain was declared elected Chairman for the coming year.)

CHAIRMAN HILTY: We will now call for nominations for Secretary.

(Drs. Lowe, Goss and Murphey were nominated.)

Dr. MURPHEY: I wish to withdraw for personal reasons. I can not accept. I thank you for the compliment, but I want to say at this time that you are indebted to these other men for the very excellent program that we have had. They have had the work of arranging the program, and being of a very lazy disposition I have no apology to make.

Dr. LOWE: I am not a candidate for any office. I wish to withdraw my name.

(The nomination of Dr. Goss was seconded, and it was moved, seconded and carried that nominations close and the Secretary be instructed to cast the unanimous ballot of the section for Dr. Goss. That was done, and Dr. Goss was declared elected Secretary for the coming year.)

Adjournment.

## REPORTS OF RESIDENT SECRETARIES

### COLORADO

The State of Colorado has a good, live veterinary organization, and its meeting at Fort Collins was well attended. This State Association is making every effort to coöperate with the American Veterinary Medical Association and to secure membership for the larger body. The veterinarians of Colorado are on their toes; they are a live, awake body of men, and there is no reason why all the qualified men should not be induced to join the A. V. M. A.

The U. S. Bureau of Animal Industry is still active in the control of contagious diseases, but horribly handicapped by lack of men and money. When the Bureau men are directed in such a manner as the inspector in charge at Denver directs them they are of direct benefit to the practitioner as well as to the livestock man.

There is very little cattle scab or sheep scab left in this State.

Hog cholera is well under control, but occasional outbreaks may be looked for, as well as recurrence in infected districts.

Anthrax still continues to keep the men of the southwestern part of the State on the *qui vive*.

Vesicular stomatitis is carefully investigated by the practitioner and by State and Federal men to prevent a possible mistake in diagnosis and a possible delay in controlling an outbreak of foot-

and-mouth disease. More attention is being paid to sterility. Dairy practice is looking up.

Hemorrhagic septicemia in sheep is being controlled by vaccination.

A large amount of work of an educational character is still to be done with the range man in order that he may appreciate the uses of the veterinarian in the control of losses on the range. The veterinarian in range districts should be posted on how to handle range problems in a range way.

Monte Vista, Colo.

LAWRENCE L. GLYNN.

### IDAHO

Although Idaho is considerably larger than New York and Pennsylvania together, it has only 430,000 people, and much of the State is so mountainous as to be unfit for livestock grazing. The elevation ranges from 700 feet above sea level in the Snake river valley to 8,000 or 10,000 feet. The average in the northern part is about 2,500, and in the southern from 3,500 to 5,000. Traveling by railroad in Idaho is rather tedious. For example, in order for people in the northern part of the State to reach Boise, our State Capital, one must go through Washington and Oregon, or Washington and Montana, a distance of nearly 500 miles.

Idaho is the leading sheep State in the Union. Hampshires and Lincolns predominate, with many Shropshires, Rambouillets, Corriedales and Cotswolds. The swine industry was seriously crippled in 1911 to 1915 by cholera, but it is almost free from this scourge at present. The cattle business is largely range stuff, with many new herds of purebreds being started. The horse business is dwindling, due to the rapid increase of tractors.

There are about 55 graduates registered for practice, and 25 non-graduates. A number of quacks ply their trade, but these are finding more profitable lines in other occupations. Practically every town in the State has one or more graduates, and outside veterinarians who are lured west by tales of easy money should carefully investigate before deciding to locate. Commercial club literature is sometimes written by a direct descendant of the late Ananias.

The laws regulating the practice of veterinary medicine and surgery in Idaho went into effect in 1913. At the present time full information can be procured by writing the Secretary of State, Boise, Idaho. In brief, a board of examiners, composed of three graduates, give an examination on anatomy, surgery, practice of veterinary medicine, pathology, chemistry, clinical diagnosis, therapeutics, physiology, sanitary medicine, meat and milk inspection, obstetrics, dentistry, bacteriology, histology, hygiene, and if this is not enough, any other subjects the examiners may prescribe. The dates of examination are the second Tuesday of May and November, at the State Capitol, Boise. The application must be presented 15 days before examination and, for graduates, accompanied by \$5.00 and an unmounted photograph, and the applicant must be a graduate of a school recognized by the Bureau of Animal Industry.

Reciprocity may be arranged with Oregon, Washington, Nevada, Utah, Wyoming and Montana. The diploma must be presented at time of application. For nongraduates the fee is \$10. A renewal fee of \$2 must be paid before the first of July each year. This is a new wrinkle, and professional men are not taking kindly to this form of tribute.

The State veterinary department is now under a Commissioner of Agriculture, and the department is run along political lines. Veterinarians of opposing political views are not supposed to be competent. The work is largely based on fees, and much labor and ill-feeling result from this. This is due to the different laws. In Washington the rancher calls the Deputy State Veterinarian and is attended at the State's expense; in Idaho, perhaps on an adjoining farm, the rancher must pay the deputy's expense and \$8 per day.

The principal diseases among horses are some glanders, influenza, pernicious anemia, mange, digestive troubles, barb-wire cuts; in cattle, very little tuberculosis, some mange, blackleg, bloat, etc.; in hogs, rickets, too much protein diet, pneumonia, and hemorrhagic septicemia; in sheep, scabies, blackleg, hemorrhagic septicemia, digestive troubles and maggot infestation.

Much highway construction is being done, and in the near future the practitioner will be able to run his car all year. Much good work is being done along tuberculosis eradication, scab and cholera work.

Moscow, Idaho.

E. T. BAKER.

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### MISSOURI

As soon as I received notice of my appointment as Resident State Secretary, I issued a circular letter to every member of the Association in Missouri, urging them to make preparations to attend this meeting, and endeavored as best I could to stimulate them to activity by impressing upon them the necessity of having a strong central organization, and as well as the necessity of each one contributing not only of his money, but that it was his duty to encourage the officers and management with his presence at this meeting, and also that he was under obligations to enlarge the membership by gathering in new members to the end that all would have a part in the upbuilding of our Association and the making of a larger and better profession.

Later, a circular letter was issued to all graduates of veterinary medicine in this State, who we believe were eligible to become members, but were not members, inviting them to send in their applications at once, and endeavoring to impress upon them their duty to support the institution that must be their national representative.

I am sorry to say that my efforts have not been as successful as I had hoped. We have by far too many eligible veterinarians in Missouri that are not members of this Association, and neither is the representation of the membership from that State at this meeting what we believe it should be. It is plainly evident that this campaign must be continued and strengthened.

F. M. CAHILL.

St. Joseph, Mo.



## BRAZIL

As Resident Secretary for the country of Brazil, I herewith append a few notes upon the livestock and veterinary conditions in this country.

I have just returned from the Third National Livestock Show held in Rio de Janeiro, July 4-11, mid-winter here with the sun in the north instead of south. There were some 1,300 animals exhibited, among them some very good specimens of the breeds represented, and some otherwise. There were some 50 head of horses; English, English Arab and Hackneys. Some 1,000 cattle were exhibited as follows: About 300 zebu apparently totally immune to infection of tick plasmoses, and immune largely to infestation with ticks and warbles (bernes); about 100 each of Hereford, Shorthorn, Angus, Brown Swiss and Holstein, and representatives of Red Lincoln, Devon, Limousine, Simmenthal, Red Roll, Normandy, Flemish, Mochos Polled Caraci, Jersey, Guernsey and Caracir (native breed). Some 250 swine were represented in the following order: Durocs, Poland China, Berkshire, Large Black, Canastrio (native breed). A few Lincoln and Romney Marsh sheep and a few Toggenburg and scrub goats were also shown.

There is no question that this is "a coming livestock country," largely because of its cheap grazing lands and excellent pastures practically the year round. Most of the cattle get rolling fat on pasture alone, without a mouthful of grain. The principal grasses are Catingueira or Gordura (*Melina minutiflora*) and Jaragua (*Andropogon rufus*). Rhodes grass and others are also popular.

Armour, Swift, Wilson and others have or are contemplating packing houses here.

Naturally there is comparatively little for the private practitioner here as yet, but his day is coming.

The livestock man, however, has a number of diseases and parasites to contend with. The ones I have seen and heard most about are as follows:

Horses and mules: Strangles, glanders, osteoporosis, mal de cadeira, tetanus, forage poisoning.

Cattle: Foot-and-mouth disease, anthrax, blackleg, malignant edema, hemorrhagic septicemia, mad itch (pseudo-rabies), calf scours, tuberculosis, tick fever, berne.

Swine: Hog cholera, hemorrhagic septicemia, probably other mixed infections, *Cysticercus cellulosae*, foot-and-mouth disease.

Dogs: Distemper, rabies, bicho do pe, berne.

Fowls: Spirochetosis, hemorrhagic septicemia, roup.

All animals suffer more or less from various parasitic worms, mange, etc.

Regarding osteoporosis (cara inchada), Dr. Conreur of Rio de Janeiro recently stated that it is due to cyclosporiasis. I met the Doctor in Rio last week and he said all cases he had autopsied were grossly infested and that when treated early with vermifuges improvement or recovery followed, hence his conclusion. I have



several cases under observation now at the Instituto de Veterinaria and hope to draw some conclusions later myself. In the States I have seen many early cases cut short by removal of the animal to another farm or region of the State.

Mal de cadeira (posterior paralysis), caused by *Trypanosoma equinum*, causes many deaths among horses and mules in some sections of the country.

Foot-and-mouth disease causes many losses in suckling calves and pigs. It also results in granulomatous growths between the digits in many adult cattle, which so interferes with walking that slaughter is most economical and humane in many cases.

Tick fever is somewhat of a disputed question here, some claiming both piroplasmosis and anaplasmosis. Others claim the anaplasmosis only a stage in life history of former and can be readily produced artificially in normal animals by introduction of various mineral salts. Good results are claimed by many in treatment by 1 to 5 per cent solution trypanblue in 100 c.c. or 25 c.c. doses.

Berne (dermatobia) is one of the serious troubles of this country. It has a life history similar to our ox warble, but the larvæ are often in great numbers anywhere from the head to tail and back to hoof. The shoulders are usually most grossly infested. Berne in or under skin of man is not uncommon as well as in cattle and dogs, which may be of further interest.

Hog cholera perhaps exists in this country, though I have not seen any. The great distances between many herds perhaps holds it in check to a great extent. Swine plague, however, is apparently quite common.

*Cysticercus cellulosae* is also quite prevalent. I held an autopsy recently on a shoat that had been breathing heavily and whose shoulders were unusually prominent. I could hardly find a piece of muscle anywhere, inside or out, that was not a mass of cysts. I had never seen nor heard of such extensive infestation before.

Bicho do pe (*Sarocopsylla penetrans*) is a burrowing flea which is commonly encountered about hog pens and often found in the feet of dog and man.

The screw worms (*Sarcophaga* and *Lucilia*) are likewise serious pests, infesting all wounds, surgical and accidental, unless quite purulent.

There are or have been five veterinary schools in Brazil issuing diplomas and one giving a joint course in agriculture and veterinary medicine. The latter is at Porto Alegre and was established about 1898.

The others are at Rio de Janeiro (1905), Recife (Olinda) (1906), Bello Horizonte (1908), Sao Paulo (1920).

As near as I can get at it, there are something like 50 veterinarians in Brazil, about one-half of them graduates of the above-mentioned schools. I have solicited a few names for membership, but those asked did not see the advantages of membership if able to secure the JOURNAL. Several indicated a desire to subscribe for the JOURNAL.

Sao Paulo, Brazil.

G. A. ROBERTS.

## REPORT OF TREASURER

## Receipts from November 5, 1919, to August 3, 1920

1919	
November	
8 From Dr. W. H. Dalrymple, Journal Fund.....	\$896.24
17 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	3,679.35
December	
19 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	2,259.95
1920	
January	
17 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	772.25
23 From Dr. W. H. Dalrymple, Journal Fund.....	1,036.00
February	
21 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	2,266.61
March	
9 From City National Bank, interest on \$7,000 for four months, A. V. M. A. Fund.....	93.33
10 From Dr. J. R. Mohler, Journal Fund.....	400.58
16 For interest on \$7,000 for four months, Journal.....	93.33
20 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	700.45
April	
20 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	713.46
24 From Dr. J. R. Mohler, Journal Fund.....	1,375.22
May	
20 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	1,014.50
June	
10 From Dr. J. R. Mohler, Journal Fund.....	1,389.03
18 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	283.68
July	
14 Interest on Liberty Bonds, Journal Fund.....	143.09
14 Interest on Liberty Bonds, A. V. M. A. Fund.....	143.09
26 From Dr. N. S. Mayo, A. V. M. A. and Journal Fund.....	260.00
August	
3 From Dr. J. R. Mohler, Journal Fund.....	1,168.71
Total Receipts.....	\$18,688.87

## EXPENDITURES

## Association Fund

1919	
November	
8 N. S. Mayo, salary for October.....	\$100.00
8 N. S. Mayo, office expenses for October.....	45.21
8 J. W. Griffith, expenses as resident secretary for 1916 and 1917 in Iowa .....	31.61
22 S. J. Walkley, expenses as member committee on legislation..	22.25
22 W. Horace Hoskins, expenses as chairman committee on legis- lation .....	7.75
22 W. Horace Hoskins, expenses as secretary-treasurer Salmon Memorial Fund .....	6.01
22 J. R. Mohler, expenses as chairman Executive Board.....	28.50
22 W. M. Burson, expenses as resident secretary for Georgia.....	2.00
22 W. H. Welch, expenses as resident secretary for Illinois.....	12.00
22 Geo. H. Hart, expenses as resident secretary for California....	3.00
December	
15 Ravenswood Press, printing.....	137.60
15 A. Eichhorn, expenses as chairman committee on abortion.....	15.30
15 N. S. Mayo, salary for November.....	100.00

December	
15 Alice Leblanc, expenses New Orleans meeting.....	44.18
15 W. G. Hollingsworth, expenses resident secretary.....	11.10
15 E. A. Knight, expenses New Orleans meeting.....	52.00
15 N. S. Mayo, expenses of self and assistant secretary to New Orleans meeting .....	260.36
15 N. S. Mayo, office expenses for November.....	46.51
15 M. Jacob, expenses to New Orleans meeting.....	43.25
15 H. Preston Hoskins, expenses as resident secretary for Michigan .....	22.39
15 C. P. Fitch, expenses as resident secretary for Minnesota.....	9.75
15 W. Horace Hoskins, expenses as secretary Salmon Memorial Fund for November.....	7.80
15 A. S. Cooley, expenses as chairman of section on practice.....	4.00
15 P. J. Schwartz, refund account application not accepted.....	2.50
15 F. E. Wynt, refund account application not accepted.....	2.50
15 Chas. J. Gruber, refund account application not accepted less subscription Journal .....	9.00
15 F. W. Schoneweg, refund account application not accepted.....	5.00
15 O. H. Basseches, refund account application not accepted.....	2.50
15 W. S. Dodge, refund account application not accepted.....	10.00
15 G. H. Atkinson, refund account application not accepted.....	10.00
15 S. A. Richardson, refund account application not accepted.....	2.50
15 C. C. Winegarden, refund account application not accepted....	9.00
15 A. C. Dunlap, refund account application not accepted.....	10.00
19 S. B. Newman & Co., Knoxville, Tenn., printing.....	31.00
19 G. H. Smith, preparing treasurer's report, etc.....	15.60
20 Ravenswood Press, printing stationery.....	19.85
20 W. D. James, refund on 1919 dues.....	3.75
20 V. A. Moore, expenses of President.....	10.48
29 Master Reporting Co., reporting meeting.....	365.00
29 C. J. Gruber, balance refund account application not accepted....	1.00
1920	
January	
10 N. S. Mayo, salary for December.....	\$100.00
10 N. S. Mayo, office expenses for December.....	122.36
19 W. Horace Hoskins, expenses as chairman committee on legislation .....	2.50
19 H. Preston Hoskins, floral wreath Dr. States.....	10.00
19 H. C. Simpson, expenses as resident secretary for Iowa.....	25.00
19 Ravenswood Press, printing stationery.....	41.50
19 C. H. Case, expenses as resident secretary for Ohio.....	15.00
February	
4 L. Frothingham, expenses as resident secretary for Massachusetts .....	13.51
4 C. A. Cary, traveling expenses, stationery, etc.....	129.24
4 W. A. Hilliard, expenses as resident secretary for Manitoba....	10.55
4 N. S. Mayo, office expenses for January.....	105.34
4 N. S. Mayo, salary for January.....	100.00
14 W. Horace Hoskins, expenses as chairman committee on legislation .....	20.13
14 Chas. S. Chase, expenses as resident secretary for New York....	8.50
14 Ravenswood Press, printing stationery.....	19.85
14 S. J. Walkley, expenses committee on legislation.....	162.27
March	
6 City National Bank, Knoxville, Tenn., for \$7,000 worth of Liberty Bonds .....	6,491.80
6 N. S. Mayo, office expenses for February.....	56.00
6 N. S. Mayo, salary for February.....	100.00
13 S. J. Walkley, expenses committee on legislation.....	22.45
13 W. Horace Hoskins, expenses committee on legislation.....	8.80
13 H. H. West Co., paper and dater.....	6.00
13 L. A. Merillat, balance on typewriter.....	50.00
13 Ravenswood Press, printing.....	29.00

April	
8 Ravenswood Press, printing.....	9.50
8 Evanston Letter Service, multigraphing.....	3.44
8 N. S. Mayo, salary for March.....	100.00
8 N. S. Mayo, office expenses for March.....	60.00
10 S. J. Walkley, expenses legislative committee.....	26.71
10 W. Horace Hoskins, expenses legislative committee.....	20.45
10 H. H. West Co., typewriter supplies.....	10.60
10 C. A. Cary, expenses attending meetings.....	53.15
24 Ravenswood Press, printing.....	12.50
24 Evanston Letter Service, multigraphing.....	3.02
May	
17 Ravenswood Press, printing stationery.....	104.85
17 N. S. Mayo, salary for April.....	100.00
17 N. S. Mayo, office expenses for April.....	64.31
17 W. Horace Hoskins, expenses as secretary-treasurer Salmon Memorial Fund .....	7.00
17 L. E. Day, expenses education committee.....	41.39
17 Schiller the Florist, flowers for Dr. Grange.....	4.75
June	
1 S. J. Walkley, expenses legislative committee.....	\$19.10
1 H. D. Bergman, expenses inspecting St. Joseph Veterinary College .....	19.80
1 H. H. West Co., typewriter supplies.....	6.00
1 N. S. Mayo, salary for May.....	100.00
1 N. S. Mayo, office expenses for May.....	42.88
15 J. H. Murry, stenographer to Dr. Cary.....	30.00
15 Evanston Letter Service, multigraphing.....	3.67
19 W. E. Muldoon, printing.....	8.75
July	
12 Robt. Graham, attending meeting committee on abortion.....	43.02
12 Ward Giltner, attending meeting committee on abortion.....	28.80
12 Ravenswood Press, printing.....	9.75
12 N. S. Mayo, office expenses for June.....	54.65
12 N. S. Mayo, salary for June.....	100.00
12 Gaut-Ogden Co., office supplies.....	2.80
12 Union Publishing Co., printing stationery.....	10.75
12 C. P. Fitch, attending meeting committee on abortion.....	82.93
12 S. J. Walkley, expenses legislative committee.....	26.00
August	
4 H. D. Bergman, expenses resident secretary for Iowa.....	13.75
4 B. T. Simms, expenses inspecting Veterinary College.....	53.58
4 J. F. DeVine, expenses committee on abortion.....	58.00
4 J. P. Turner, expenses legislative committee.....	29.94
4 L. E. Day, expenses committee intelligence and education.....	18.80
4 Ravenswood Press .....	8.00

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\$10,564.69

## EXPENDITURES

1919		Journal Fund
November		
5 Miss Byrne Monget, salary for October.....		\$60.00
14 W. H. Dalrymple, salary for October.....		125.00
14 J. K. Roumain, office rent for October.....		35.00
14 Baton Rouge Repair Works, addressograph repairs.....		70.75
14 Ramires-Jones Printing Co., printing and mailing November issue of Journal .....		816.84
28 Addressograph Co., stencils.....		5.37
December		
19 J. K. Roumain, office rent for November.....		35.00

December		
10	Miss Byrne Monget, salary for December.....	60.00
19	W. H. Dalrymple, salary for November.....	125.00
19	Ramires-Jones Printing Co., printing and mailing December issue of Journal.....	877.38
1920		
January		
10	W. H. Dalrymple, salary for December.....	125.00
10	Miss Byrne Bonget, salary for December.....	60.00
10	Addressograph Co., stencils.....	7.90
12	W. H. Dalrymple, to reimburse him for additional salary to Miss Monget for six months (July to December).....	150.00
12	Miss Byrne Monget, expenses A. V. M. A. meeting.....	27.20
12	J. K. Roumain, office rent for December.....	35.00
February		
4	L. E. Mire, packing and preparing Journal equipment for shipment.....	62.50
14	Baton Rouge Repair Works, repairs to addressograph and typewriter.....	18.50
March		
6	W. H. Dalrymple, telegrams.....	2.44
6	J. R. Mohler, salary for December and January.....	350.00
15	City National Bank, Knoxville, Tenn., for \$7,000 worth of Canadian Bonds.....	6,619.78
17	Andrew B. Graham Co., printing January and February Journal.....	2,188.99
April		
8	Andrew B. Graham Co., printing March Journal.....	1,133.20
10	I. M. Pickens, assisting in editing Journal.....	45.00
10	M. W. Kling, assisting in Journal office work.....	45.00
10	Addressograph Co., March account.....	5.80
April		
10	Gibson Bros, printing stationery.....	\$58.00
24	J. R. Mohler, February and March salary.....	350.00
27	A. B. Graham Co., printing April Journal.....	1,188.68
May		
17	I. M. Pickens, assisting in editing Journal.....	45.00
17	M. W. Kling, assisting in Journal office work.....	45.00
17	Gibson Bros., buying and printing envelopes.....	41.25
17	Addressograph Co., stencils.....	4.41
June		
1	J. R. Mohler, April and May salary.....	350.00
15	Gibson Bros., buying and printing envelopes.....	134.50
15	A. B. Graham Co., printing May Journal.....	1,294.99
19	Addressograph Co., stencils.....	6.88
19	I. M. Pickens, assisting in editing Journal.....	45.00
19	M. W. Kling, assisting in Journal office work.....	45.00
July		
12	A. B. Graham Co., printing June Journal.....	1,442.70
12	Addressograph Co., stencils.....	3.11
12	Gibson Bros., printing envelopes.....	5.75
12	I. M. Pickens, assisting in editing Journal.....	45.00
12	M. W. Kling, assisting in Journal office work.....	45.00
		<hr/>
		\$18,176.92

Knoxville, Tenn., August 3, 1920.

Dr. M. Jacob, Treasurer,  
American Veterinary Medical Association,  
Knoxville, Tennessee.

Dear Sir:

We enclose herewith cancelled checks and statements of the balance as of this date in the following accounts:



American Veterinary Medical Association.....	\$3,173.19
Journal Fund .....	1,693.62
Relief Fund .....	693.48

Yours truly,

THE CITY NATIONAL BANK.

By R. E. MOONEY, Vice-Pres.

**RECAPITULATION**

Bank balances at beginning of period.....	\$17,391.74
Plus amount on time deposit (Relief Fund).....	1,000.00
	<hr/>
	\$18,391.74
Less checks cashed during period which were issued and included in previous report .....	960.79
	<hr/>
	\$17,430.95
Receipts during period covered by this report.....	18,688.87
	<hr/>
	\$36,119.82
Less expenditures during period.....	28,741.61
	<hr/>
Balance on hand.....	\$7,378.21
Total bonds on hand.....	*18,984.78
	<hr/>
Grand total .....	\$26,362.99

**Association Fund**

Bank balance at beginning.....	\$7,364.03
Less old checks cashed.....	19.80
	<hr/>
	\$7,344.23
Receipts during period.....	6,211.57
	<hr/>
Total .....	\$13,555.80
Expenditures during period.....	10,564.69
	<hr/>
Balance .....	\$2,991.11
Bank balance .....	\$3,173.19
Outstanding checks .....	182.08
	<hr/>
	\$2,991.11

**Journal Fund**

Bank balance at beginning.....	\$8,334.23
Less old checks cashed.....	940.99
	<hr/>
	\$7,393.24
Receipts during period.....	12,477.30
	<hr/>
Total .....	\$19,870.54
Expenditures during period.....	18,176.92
	<hr/>
Bank balance .....	\$1,693.62
Balance .....	\$1,693.62

**Relief Fund**

Bank balance.....	\$693.48
(No receipts or expenditures)	
Plus amount on time deposits.....	2,000.00
	<hr/>
	\$2,693.48

\*Purchase price.

Balance to credit of A. V. M. A. Fund.....	\$2,991.11	
Plus total amount of bonds on hand.....	9,515.00	\$12,506.11
Balance to credit of Journal Fund.....	\$1,693.62	
Plus total amount of bonds on hand.....	9,469.78	11,163.40
Balance to credit of Relief Fund.....		2,693.48
Total balance cash and bonds on hand.....		\$26,362.99
<b>Bond Recapitulation</b>		
Canadian Bonds, Par....	\$3,000.00	Purchase price..... \$3,023.20
Liberty Bonds, Par.....	7,000.00	Purchase price..... 6,491.80
	\$10,000.00	\$9,515.00*
Liberty Bonds, Par.....	\$3,000.00	Purchase price..... \$2,850.00
Canadian Bonds, Par....	7,000.00	Purchase price..... 6,619.78
	\$10,000.00	\$9,469.78†

\* Association Fund. † Journal Fund.

### NEW EXECUTIVE BOARD MEMBER

The following is the result of the ballot for member of the Executive Board of the A. V. M. A. from the Fifth District:

C. E. Cotton, 221; W. T. Spencer, 93; C. H. Stange, 58; W. F. Crewe, 38; C. P. Fitch, 23; irregular and unsigned votes not counted, 5.

It is probable that a few more votes will be received from the Philippine Islands, but these can not change the result materially.

The delay in reporting the results of the voting in the Fifth District is due to the time necessary to get returns from the Islands. Under favorable conditions sixty days are required to get mail to the Philippines and a reply.

N. S. MAYO, *Secretary*.

Dr. I. Nakanishi has given up his practice at Cabinet, Idaho, to accept a position in the Serum Laboratory at Fusan, Korea, Japan.

Dr. W. J. R. Fowler, of Toronto, Canada, is reported to be seriously ill. His many friends on both sides of the line hope for his prompt recovery.

*Semi-Weekly Farm News* announces the existence of glanders in Texas. The State veterinary surgeon, after a 24-hour observation of 19 horses, found 8 positive cases. The bodies were burned.

## OTHER MEETINGS

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### VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of Veterinary Medical Association of New York City was held in the lecture room of Carnegie Laboratory, New York City, on Wednesday evening, November 3, with President MacKellar in the chair.

The minutes of the October meeting were read and approved.

Dr. John F. DeVine gave a splendid report of the B. A. I. Conference on Tuberculosis at Philadelphia, October 11-13. This was a meeting of State and Federal employes, engaged in coöperative tuberculosis eradication work, cattle breeders and veterinary practitioners, held in Leonard Pearson Hall at the University of Pennsylvania. Dr. DeVine reported the conference a success from every viewpoint, as the program was well arranged to get the ideas of those who were interested in the work.

There was a good discussion on Dr. DeVine's report.

Dr. William J. McKinney gave an address on the present conditions in Ireland.

The Doctor made an extensive tour of Ireland during the summer. He said political conditions were fully as bad as reported in the newspapers. Industrial Ireland is prosperous, crops excellent and poverty practically unknown outside of the large centers. The Doctor visited the local veterinarians, rode around the country with them on their rounds, where he witnessed a number of unusual operations and cases which he reported interestingly.

Dr. I. E. Altman was unanimously elected as a member of the Association.

Dr. Berns, of the Program Committee, said Dr. Gannett would present a paper at the December meeting on "The Value of Tenotomy of the Perforans Tendon in Cases of Vaginitis of the Hock and Navicular Bursitis."

Dr. R. W. Gannett reported an interesting case of a bitch very heavy in whelp with labor pains intermittent. The Doctor made an examination and gave an ampule of pituitin at 2 p. m. The next morning she was in about the same condition. He then gave two ampules of pituitin during the day and she whelped nine live puppies.

No further business appearing, the meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary*.

### SOUTHEASTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION

A very enjoyable meeting of the association was held at the Detroit Board of Commerce, Wednesday afternoon and evening, November 17, 1920. Dinner was served at 6 o'clock and this feature undoubtedly was responsible for the large attendance.

Dr. Judson Black, of Richmond, Michigan, addressed the association on the "Present Status of the Horse Breeding Industry in Michigan." Dr. Black's work on the Stallion Registration Board keeps him in close touch with the trend of horse breeding and his address proved highly interesting. There has been a marked falling off in the breeding of all kinds of horses in Michigan, and this is most felt in the scarcity of good draft animals, especially well-matched pairs. Dr. Black spoke of the most excellent work being done by the Horse Association of America and urged all veterinarians to help the work along, especially by carrying information to their clients.

Another very interesting statement made by Dr. Black was to the effect that the Province of Ontario had recently enacted some legislation which meant the end of the veterinary correspondence school located at London, Ontario. This fake institution has mulcted thousands of dollars from the unwary and uninformed in all States of the Union, has caused all kinds of trouble for many State veterinary examining boards, and has always conducted its business in such a way that it was practically impossible to get evidence that could be used for the purpose of having the Post Office Department issue a fraud order, forbidding the use of the mails.

Dr. H. H. Sparhawk, Chief Veterinarian, Food Inspection Division, Detroit Board of Health, addressed the members on the proposed municipal meat inspection ordinance now under consideration by the City Council. This ordinance is exceptionally well drawn up, and if passed without alterations, will give to Detroit a system of municipal meat inspection better than any now in force in any large city in the United States. A committee of three members of the association was appointed to coöperate with Dr. Sparhawk and the Board of Health, in urging and securing the passage of the ordinance.

Dr. O. A. Taylor, a member of the veterinary faculty at East Lansing, was present and told of conditions at the college this year. As was the case with practically all veterinary colleges this year, there was a marked falling off in the enrollment. The surprising

part of this, so far as the Michigan Agricultural College was concerned, was that the small enrollment followed what was considered to be a normal number of inquiries concerning the veterinary course, during the months prior to the opening of college.

The meeting adjourned, to meet again in January.

H. PRESTON HOSKINS, *Secretary*.

### CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

THE eleventh semi-annual meeting of the C. N. Y. Veterinary Medical Association was held in Syracuse, November 18, 1920.

The meeting opened with a clinic at the infirmary of Dr. A. J. Pendergast.

The following cases were operated upon:

Bay Gelding—Dr. J. H. Stack's case of ulcerated teeth; Surgeons, Drs. Knapp & Knapp.

Bay Gelding—Dr. Dooling's case of ulcerated teeth; Surgeons, Drs. Ide and Knapp.

Bay Gelding—Dr. Sullivan's case of ulcerated teeth; Surgeons, Drs. Currie and Stack. (In the two last mentioned cases it was necessary to trephine and punch the teeth out.)

Bay Gelding—Complete ankylosis of the ankle joint; animal was destroyed.

Bay Gelding—Dr. Stack's case of quittor; Surgeons, Drs. Stack and Currie.

This completed the clinic, so the meeting adjourned to the St. Cloud Hotel, where the regular meeting was called to order by the President, Dr. A. J. Tuxill.

Roll call showed the following members present:

Drs. W. G. Hollingworth, W. B. Switzer, F. E. York, J. A. Pendergast, J. M. Currie, A. J. Tuxill, E. E. Dooling, Frank Morrow, C. R. Baldwin, W. M. Pendergast, Almond H. Ide, J. H. Hewett, W. M. Sullivan, J. H. Stack, W. M. Long, D. A. Boardman, W. M. Thompson, J. B. Knapp, D. M. Hoyt, F. E. Hoyt, F. N. Burk, Otto Faust.

Moved and carried that the minutes as read be accepted and placed on file.

Under the head of applications for membership, the following names were presented:

Dr. R. E. Davis, Clinton, and Dr. V. M. Becker, Ilion, and they were duly elected.



Moved and carried that the President have full charge of the clinic at time of meetings and that this be brought up in connection with revising the by-laws.

It was thought best to call the next meeting during the second week in June and that the matter of changing the time of meeting as set forth in by-laws be acted upon at the proper time.

Dr. J. B. Knapp read a very interesting paper on Milk Fever, which was followed by a very thorough discussion and many phases of this very common disease were brought out.

Dr. Otto Faust told of one case where he inflated the udder 16 times three hours apart, stripping the udder out each time before injecting fresh oxygen, and the cow made a good recovery.

Dr. Currie gave a very interesting account of a case of foreign bodies in the stomach.

Dr. D. M. Hoyt presented a paper on Malignant Catarrhal Fever of Cattle.

Dr. Hoyt's paper was well discussed, after which the matter of "quacks" bringing patients to be operated on at the clinic was brought up and thoroughly gone over.

On account of the failure of the committee to procure a cow, Dr. Ide was asked to bring his outfit and demonstrate his cattle throwing harness and the suspension bandaging of the udder at the June meeting.

The last half hour was given to a general discussion of various subjects, after which a motion was made, seconded and carried to adjourn.

W. B. SWITZER, *Secretary*.

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Dr. Hal C. Simpson, for many years the indefatigable secretary of the Missouri Valley Veterinary Medical Association, has removed from Denison, Iowa, to the balmy climate of Pomona, Calif.

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Dr. W. J. Butler, State Veterinarian of Montana, has an interesting article on the "Dairy Law Enforcement in its Relation to Tuberculosis," in the Bulletin of the Department of Health of his State, for September-October, 1920.

In his report as State Veterinarian, which has just been issued, Dr. Butler calls attention to the fact that infectious and contagious diseases among livestock in Montana are less prevalent than at any time since the establishment of his department.

## COMMUNICATIONS

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### FOOT-AND-MOUTH DISEASE IN INDIA

TO THE EDITOR:

*Dear Sir:* On page 7 of your valuable JOURNAL for October, 1920, under head foot-and-mouth disease research, the statement from a special cable from London is reproduced, stating that Indian cattle are not subject to foot-and-mouth disease.

As a matter of fact the disease is rampant from Cape Comorin to Peshawar, and is practically always with us. It attacks young stock on this farm regularly twice a year. What troubled the 1912 commission in India was the mild type of the disease generally met with, not its absence. Imported cattle and sheep suffer much more severely than indigenous animals. I have seen very severe cases and many deaths in imported Australian Merino sheep.

Continual contact with the disease may have rendered indigenous stock more resistant.

R. BRANFORD, I. C. V. D.,  
*Superintendent Government Cattle Farm.*

Hissar, India.

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### A WONDERFUL OPPORTUNITY

TO THE EDITOR:

The JOURNAL as a rule does not boost speculative stocks or enterprises, but the following opens such wonderful possibilities for veterinarians to invest their accumulated surplus that I have determined to "let the cat out of the bag" and give all the brethren an equal opportunity.

Further information regarding this investment can probably be obtained from Drs. McNeil, Tom Smith, or the Lowe brothers, all wealthy New Jersey speculators.

Yours, very truly,

J. P. TURNER.

MAIN OFFICE OF THE  
CAT HOUSING CORPORATION OF N. J.

MY DEAR DR. TURNER:

Knowing that you are interested in and open for an investment in a good live business proposition, I take the pleasure of presenting to you what seems to me to be a most excellent business proposition and in which no doubt you will take a lively interest. Please advise

me the amount of stock you wish to subscribe toward forming a company for the exploitation of this wonderful idea.

The object of this company is to operate a large cat ranch in Newark, N. J.—the abandoned Ford Shipbuilding plant near Newark can be purchased cheaply.

The corporation shall be known as the Cat Housing Corporation of New Jersey. The amount of capital stock shall be \$50,000, all of which shall be common stock.

To start with we will collect about 100,000 cats—each cat will average about 12 kittens a year. The skins will sell for about 10 cents per skin for the white ones and 75 cents for the black ones. We will have about 12,000,000 skins to sell at an average of 42 cents, making the revenue about \$500,000 per annum.

A man can skin about 50 cats per day. He will charge \$4 per day for his labor. It will take about 80 men plus 10 per cent for indirect overhead to operate the ranch, therefore the profit will be about \$350,000 clear.

We will feed the cats on rats, and we will start a rat ranch adjoining the cat ranch. The rats will multiply four times as fast as the cats, and if we start with 100,000 rats we will have four rats for each cat a day, which is plenty.

We will feed the cats on rats and in turn we will feed the rats on the stripped carcasses of the cats, thus giving each rat one-fourth of a cat.

It will be seen by these statistics that the business will be self-acting and automatic. The cats will eat the rats and the rats will eat the cats and we will get the skins.

Awaiting your prompt reply, we beg to remain,

Yours very truly,

THE CATARAT COMPANY.

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“In order to make possible the continuance of the cow-testing association in Josephine County, Oregon, the chamber of commerce at Medford recently voted \$200 to carry on the work. It is proposed to make the county a purebred Jersey center.”—*Western Farmer*.

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Dr. Grant B. Munger, of Cedar Rapids, Iowa, reports that his city has recently passed a fine milk ordinance for the control of the sale of pure milk and its by-products. The community became greatly exercised as a result of certain disclosures regarding the quality of its milk supply, and this admirable milk ordinance was the direct result.

## NECROLOGY

IT is with deep regret that we announce the death of Dr. Edward Wallis Hoare, F. R. C. V. S., at his residence, Clover Hill Court, Ireland, which occurred on November 26 at the age of 57 years, following a prolonged illness. Dr. Hoare studied veterinary medicine at McGill University, Montreal, where he graduated before returning to his native country of Ireland. Later he entered the New Veterinary College, Edinburgh, receiving a diploma of M. R. C. V. S. in 1886 and F. R. C. V. S. in 1892. He was a most indefatigable worker and contributed extensively to our veterinary literature. His most notable works, however, are "Veterinary Therapeutics," which has reached three editions and is one of the most useful practitioner's small reference books, and his ambitious "System of Veterinary Medicine," consisting of two large volumes, which is a landmark in the history of our professional literature in the English language.

Dr. Hoare was an ardent student, a keen and observant clinician, and a skillful, lucid writer, few veterinarians of this generation having done so much to raise the general standard of the veterinary practitioner.

He was lecturer in veterinary hygiene, University College, Cork, formerly Examiner in Anatomy, Royal College of Veterinary Surgeons, and late External Examiner in Veterinary Toxicology, Jurisprudence and Sanitary Law, University of Liverpool.

He was a member of many societies and was also an honorary member of the A. V. M. A. He leaves a family of one son and five daughters with his widow to mourn his loss.

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Dr. George N. Suits of Paterson, N. J., died on December 28, 1920, of acute peritoneal tuberculosis. Dr. Suits was born in Oneida County, N. Y., on October 6, 1888, and spent his boyhood on his father's farm. He attended the local High School and graduated from the Grand Rapids Veterinary College in 1913. He engaged in active practice until 1917, when he was appointed in the Bureau of Animal Industry. He became a member of the A. V. M. A. in 1918. Dr. Suits was a likable man, of excellent habits, and officially he was everything that could be desired. He leaves a wife but no children.

## MISCELLANEOUS

### FARM SENTIMENT NOW FAVORS HORSE USE

GEORGE N. WILBER, an Ohio farmer and livestock grower, addressing the Chicago Association of Commerce, claims that farmers are bearing more of the burden of present business depression than any other class; that they are between the upper and nether millstones—the upper one of high-priced necessities, the lower one of low-priced or totally unsalable farm products. “Farmers in Nebraska and Iowa are reported to be using corn for fuel, and why not,” says he, “since corn is cheaper and productive of more heat?”

Farm motive power, especially, which can be grown at home on the farm in the form of draft horses and mules, which uses staple farm products of corn, oats and hay instead of calling for gas at 30 cents a gulp, is again making a big hit with the producers. Mr. H. M. Justice, an auctioneer working through Kansas in sections where the truck and tractor salesmen have formerly been received with open arms, reports that nowadays good grade draft mares bring \$450 per pair as three-year-olds, while tractors, used two seasons and originally costing \$2,000, have brought but \$100 each and not wanted at that price. Evidently both the original cost and upkeep are counting in the farm sales now.

I. D. O'Donnell, president of the Federal Farm Loan Board, in his district near Billings, Mont., gives the reason. He says: “Tractor operators cannot grow dollar wheat, even on the cheapest Montana lands. It is only when wheat is \$2 a bushel that life is possible to them at all. I have the costs on some 98 farms using tractors in our State who cannot grow wheat under \$1.88 to save their lives. Plowing with horses costs me \$1.75 per acre. If I hire a team and driver, it costs me \$3 per acre; if I hire a tractor and driver, it costs me \$5 per acre; but even that is cheaper than I would guarantee to do it with a tractor for myself. I have owned three tractors of various sizes and tried them out on my 640-acre farm, but have now discarded all of them. I know that with five horses on a two-bottom gang plow I can outwork any three-bottom tractor in a season. At first it will look as though the horses were going to be left miles behind, but at the season's end they have not only caught up but actually surpassed the tractor in total work done.

“In emergency work and at such times as during the war, when we felt we must raise crops no matter what the cost, we used tractors.



Most of the men in our section have gone back to horses except for short times in the rush season."

Aber Brothers, farming in partnership near Sheridan, Wyo., corroborate this statement. They say: "We use our tractor only for belt power, for after three seasons' trial we find by actual comparison that we can put teams of five mules in the field on a two-bottom gang plow and do more work with such outfits than with a tractor on a two-bottom, and very much cheaper. The farmers in this community have their eyes pretty well open to the great difference in cost and are now depending almost exclusively on good heavy draft teams of horses and mules."

The Oliver Plow Company, of South Bend, Ind., reports an increase of 300 per cent in sales of horse-drawn implements. In city markets, horses are still in demand, being less affected by the general drop in prices than other types of motive power. General economies are being forced on city transportation users as well, which point to the advisability of horse use, according to current reports received by the Horse Association of America.

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*Kansas Farmer and Mail and Breeze* says of bull associations: "By means of an organization of this kind it is possible to get a higher class of animals and one that will give much better results than a cheaper and poorer type of animal."

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President White has appointed Dr. Leonard W. Goss of Columbus, Ohio, to be representative of the A. V. M. A. in the National Research Council. This council has headquarters at 1701 Massachusetts Avenue, Washington, D. C.

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Hon. Perry Mayo, father of Secretary N. S. Mayo, died of apoplexy on January 5. Mr. Mayo was eighty-one years old. He had been a resident of Michigan practically all his life and had taken an active part in agricultural organizations and in State politics. He was also a veteran of the Civil War.

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Canned whale meat, which resembles lean beef, is beginning to appear on American markets. One whale will turn out about 80,000 pounds of meat.—*Oklahoma Farmer*.

